THE DECAPODA OF THE SIBOGA EXPEDITION

PART V

ON A COLLECTION OF MACRUROUS DECAPOD CRUSTACEA OF THE SIBOGA EXPEDITION, CHIEFLY PENAEIDAE AND ALPHEIDAE

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ON A COLLECTION OF MACRUROUS DECAPOD CRUSTACEA OF THE SIBOGA EXPEDITION, CHIEFLY PENAEIDAE AND ALPHEIDAE

BY

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Ierseke (Holland)

With 4 plates

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TO THE MEMORY

OF HIS HIGHLY ESTEEMED AND BELOVED PARENTS

THIS WORK IS DEDICATED

BY

THE AUTHOR

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INTRODUCTION.

This paper deals with a Collection of Macrurous Decapod Crustacea of the Siboga Expedition, which were sent to the author in the second half of 1916 and in January 1917; it consists chiefly of species belonging to the Penaeidae and Alpheidae. The Collection contains 38 species, among which 2 new species and 2 new varieties; one of the most interesting is no doubt the rare *Sicyonella inermis* (Paulson), of which a young male and a young female were collected. Preliminary descriptions of the new species and varieties were already published in 1920 in: Zoölogische Mededeelingen uitgegeven vanwege 's Rijks Museum van Nat. Historie te Leiden, Deel V, Afl. 3, p. 103—107.

The figures have been made by the author, excepting the figures 3—3*d* (Pl. I), 13, 13*a* (Pl. III) and 18—18*b* (Pl. IV), that were drawn by Mr. J. F. Obbes of the Hague.

LIST OF SPECIES.

Gennadas clavicarpus de Man.
Haliporus aequalis Bate.
Solenocera pectinata (Bate).
Penaeopsis intermedia (Kish.) var. *anchista* de Man.
Penaeopsis sp.
Parapenaeus fissurus (Bate).
Parapenaeus sp.
Sicyonia parvula de Haan.
Sicyonia laevis Bate.
Sicyonella inermis (Paulson).
Ogyrides Sibogae (de Man).
Athanas Naifaroensis Cout.
Athanas parvus de Man.
Athanas Stebbingii de Man.
Athanas Djiboutensis Cout.
Arete Iphianassa de Man.
Alpheopsis sp.
Synalpheus amboinae (Zehntner).
Synalpheus jedanensis de Man.
Synalpheus paraneomeris Cout. var. *praedabunda* de Man.
Synalpheus hastilicrassus Cout. var. *acanthitelsoniformis* de Man.
Synalpheus sp.
Alpheus Hailstonei Cout. var. *laetabilis* de Man.
Alpheus Hailstonei Cout. var.
Alpheus paradentipes Cout.
Alpheus acuto-femoratus Dana.
Alpheus consobrinus de Man.
Alpheus frontalis H. M.-Edw.
Alpheus bidens (Oliv.).
Alpheus anchistus de Man.
Alpheus lepidus de Man.
Alpheus Bastardi Cout.
Alpheus euchirus Dana.
Processa aequimana (Paulson).
Nikoides Sibogae de Man.
Aegeon orientalis Henderson.
Scyllarus sp.
Enoplometopus longirostris de Man.

Family PENAEIDAE.

Gennadas Bate.

1. *Gennadas clavicarpus* de Man. Pl. I, fig. 1.

Gennadas clavicarpus J. G. de Man, Siboga Exp., Monogr. 39*a*, Part I, Family Penaeidae, 1911 (text) p. 19, 1913 (plates) Pl. I and II, figs. 3—3*k*.

Stat. 148. August 10. 0° 17'.6 S. 129° 14'.5 E. Halmaheira Sea. 1855 m. Bottom fine, grey and green mud. 2 young specimens.
Stat. 185. September 12. 3° 20' S., 127° 22'.9 E. Manipa-strait. From 1536 m. to surface. 5 specimens, of which one male is almost adult, the others very young and mutilated.
Stat. 203. September 19. 3° 32'.5 S., 124° 15'.5 E. Banda Sea. $\frac{\cdot}{4892}$. 1 young male and 3 still younger specimens.
Stat. 243. December 2. 4° 30'.2 S., 129° 25' E. West of Banda Islands. From a depth of 1000 m. to surface. 3 young specimens.

The largest of all the specimens is the male from Stat. 185, which is 31,4 mm. long (carapace 7,9 mm., abdomen 23,5 mm.). At the base of the rostrum the rostral carina is very slightly elevated, in the shape of a minute rounded prominence. Antennary angle of the carapace acute, infra-antennary angle obtusely pointed. The branchiostegal spine, which in the type specimen, a female, was described as small, appears in this male (Fig. 1) as a spine of moderate size; the deep groove, that from the apex of the antennary angle runs backward and obliquely downward, unites with another that proceeds from the branchiostegal spine and then runs farther backward almost to the level of the post-cervical groove, curving downward posteriorly. The gastro-frontal groove runs first upward towards the rostral tooth, but, reaching the rostral crest, it curves backward. The truncate, slightly concave tip of the telson bears between the movable spines at the angles, which in this specimen are lost, three pairs of feathered setae; those of the 1st or submedian pair are the longest, 0,46 mm. long, those of the 2nd are a little shorter, the setae of the outer pair still shorter, 0,3 mm. long.

The petasma apparently agrees with the third male from Stat. 230, described by me l. c. p. 22, though in this male the two laminae were not yet in contact, while in the male from Stat. 185 it is well-developed. Instead of the two large rounded lobes on the distal border, visible in fig. 3*f* (l. c.), one observes two triangular prominences, the acute tips of which are curved forward; of the two narrow teeth or prominences that occur at either side of the

petasma, that tooth which is placed next to the triangular prominence, is the longer, shows the same width along its whole length and is curved laterally outward; the other shorter tooth is curved forward and acute at the tip.

The other specimens are all much younger and mostly mutilated.

2. *Haliporus aequalis* Bate.

Haliporus aequalis Sp. Bate, J. G. de Man, Siboga Exp., Monogr. 39*a*, Part I, Family Penaeidae, 1911 (text) p. 32, 1913 (plates), Pl. II, fig. 8, 8*a*.

Stat. 212. September 26. 5° 54′.5 S., 120° 19′.2 E. (West of Saleyer-island). 462 m. Bottom fine grey and green mud. 1 female.

This female bears a Bopyrid in the right branchial chamber. Unfortunately the rostrum is broken at the anterior end of the eyes; the carapace from the orbital to the posterior margin is 20 mm. long, the abdomen 48 mm., so that, when supposing that the rostrum has reached to the far end of 2nd antennular article, the entire length has been 76 mm. The 3rd abdominal tergum is obtusely carinated on its posterior half, the carina fading away anteriorly; the 4th—6th terga are sharply carinated. The telson reaches to the posterior 6th of the inner uropod and to a little beyond the middle of the outer.

The lower (shorter) antennular flagellum, 25 mm. long, is one-fourth longer than the carapace, rostrum excluded, and a little more than twice as long as the peduncle; distance between the tip of the antennular peduncle and that of the antennal scale one and a half as long as 3rd article.

The 3rd legs reach nearly by the chela beyond the antennal scale, those of the 4th pair, 60 mm. long, are 3-times as long as the carapace without the rostrum and project by the dactylus, the propodus and five-sixths of the carpus beyond the antennal scale; the peraeopods of the 5th pair, finally, are 74 mm. long and reach beyond the antennal scale by the dactylus, the propodus and seven-eighths of the carpus.

3. *Solenocera pectinata* (Bate). Pl. I, fig. 2.

Solenocera pectinata (Sp. Bate), J. G. de Man, Siboga Exp., Monogr. 39*a*, Part I, Family Penaeidae, 1911 (text), p. 45, 1913 (plates), Pl. IV, fig. 11.

Stat. 2. March 8. 7° 25′ S., 113° 16′ E. Madura-strait. 56 m. Bottom grey mud with some radiolariae. 1 young male.

Stat. 7. March 11. 7° 55′.5 S., 114° 26′ E. Near reef of Batjulmati (Java). 15 m. and more. Bottom coral and stones. 1 young male.

Stat. 142. August 5/7. Anchorage of Laiwui, coast of Obi Major. 23 m. Bottom mud. 2 young specimens.

Stat. 166. August 22. 2° 28′.5 S., 131° 3′.3 E. Midway between Ceram and New Guinea. 118 m. Bottom hard, coarse sand. 4 young specimens.

1 female collected in 1910 by Mr. KLEIWEG DE ZWAAN at Gunung Sitoli, Nias.

The female from Nias is 45 mm. long, almost adult. The rostrum (Fig. 2) is 1 + 8-dentate and reaches almost to the corneae of the eyes; the epigastric tooth has nearly the same size as the 1st rostral tooth, the following rapidly decrease in size, so that the four anterior teeth

that are nearly equal, are very small and hidden by the short plumose setae on the upper border; the apex of the anterior tooth is a little farther distant from the tip of the rostrum as from the apex of the penultimate tooth. Lower margin convex, only slightly emarginate near the tip; except near the base the lower margin is fringed with long feathered setae, that reach far beyond the tip.

Antennular flagella 14 mm. long, just as long as the carapace with the rostrum together; in the full-grown specimens, collected by the Siboga Expedition between the islands of Wowoni and Buton and that were 50 resp. 54 mm. long, these flagella were as long as the carapace without the rostrum.

The 3rd abdominal tergum appears indistinctly angular on the posterior half, while the anterior is regularly rounded, but it cannot be said to be carinated. The external maxillipeds reach by a little more than the dactylus beyond the antennal scale. The peraeopods of the 1st pair reach to the far end of the antennal peduncle, those of the 2nd to the distal extremity of the antennal scale, while the legs of the 5th pair project by the dactylus and half the propodus beyond that extremity.

The young male from Madura-strait is 29 mm. long. Rostrum 1 + 7-dentate, less broad in a lateral view than in the preceding specimen. The 3rd abdominal tergum appears distinctly carinated, except quite anteriorly, the carina, however, is obtuse and less prominent than on the 4th somite. The external maxillipeds reach only by one-third of their ultimate joint beyond the antennal scale. The peraeopods of the 1st pair extend as far as the antennal peduncle, those of the 2nd reach by the fingers, the very long legs of the 3rd pair by the chela and half the carpus, the legs of the 4th pair by the dactylus and one-third of the propodus, those of the 5th, finally, by the dactylus and almost the whole propodus beyond the antennal scale.

The young male from Stat. 7 agrees with the preceding one.

The two from the coast of Obi Major are 16 or 17 mm. long and the four from Stat. 166 are nearly of the same size.

4. *Penaeopsis intermedia* (Kishinouye) var. *anchista* de Man. Pl. I, fig. 3—3*d*.

Metapeneus ensis? A. Alcock, Catal. of the Indian Decapod Crustacea. Part III Macrura. Fasc. I. The Prawns of the Peneus Group. Calcutta 1906, p. 24?

Penaeus intermedius K. Kishinouye, Journal of the Fisheries Bureau, Vol. VIII, N° 1. Tokyo 1900, p. 21.

Penaeopsis intermedia (Kish.) var. *anchista*, J. G. de Man, in: Zoolog. Mededeelingen, uitgeg. vanwege 's Rijks Mus. v. Nat. Hist. te Leiden. 1920. Deel V, Afl. 3, p. 103.

1 male and 1 female from the Kei-islands, Wertheim Expedition.
2 females from Ternate.
1 very young specimen collected by Mr. RUTTEN at Balikpapan, East Borneo.
Stat. 323. (Siboga Exp.). February 24/25 1900. Sangkapura-roads, Bawean-island. 12 m. Bottom mud. 1 young female.
1 young male collected July 1915 by Dr. P. BUITENDIJK at Pulu Weh.

Penaeopsis intermedia (Kish.) was established upon two apparently adult females, long 12 cm., from the province of Tosa, Japan. Our specimens from the Indian Archipelago now fully agree with the description of this species and with the figure, in which, however, the

thoracic legs and other appendages are not figured, except as regards the rostrum which is obliquely directed upward and the telson, in which the anterior of the 3 lateral spinules is very small, much smaller than the two posterior that are subequal but also apparently smaller than in the typical *intermedia*. They are therefore described as a variety, but, of course, when the appendages and the petasma should afterwards prove to differ, then the variety should be raised to the rank of a species as *Penaeopsis anchista*.

The largest specimen is one of the females from Ternate, which is 80 mm. long, the other being a little smaller; the male (Fig. 3) from the Kei-islands is 77 mm. long, the female has nearly the same size, but the other specimens are much younger, especially the young specimen from Balikpapan, the length of which is 16 mm. In the larger female from Ternate and in the young male, long 52 mm., from Pulu Weh, the rostrum is armed in addition to the isolated epigastric tooth with 11 teeth, in the male from the Kei-islands and in the young female, long 45 mm., from Stat. 323 with 10 and in the three other specimens with 9 teeth: in the typical *Pen. intermedia* the rostrum bears 8 teeth in addition to the epigastric tooth. This epigastric tooth is smaller than the posterior or 1st tooth of the rostrum and stands on the anterior third of the carapace. The rostral teeth stand to the tip, the two posterior stand on the carapace and from the 5th or 6th they regularly decrease in size. The rostrum is obliquely directed upward, in the younger specimens the distal half runs straight forward, so that the line uniting the apices appears slightly arched; in the largest specimen the rostrum reaches a little beyond the 2nd joint of the antennular peduncle, in the other female from Ternate almost to the distal end of this joint, in the male from the Kei-islands to the middle, in the female just beyond the middle of the 2nd joint, in the young male from Pulu Weh to the middle, in the young female from Stat. 323 almost to the middle of this joint, while in the very small specimen from Balikpapan it extends only to the corneae of the eyes; the rostrum proves thus to be the longer, the older the specimen is and, when this variety should obtain the length of 12 cm. like the typical species, it will probably, like in the latter, be equal in length to the antennular peduncle.

Post-rostral crest low, though distinct, running nearly to the posterior margin of the carapace, bounded on each side by shallow, setae-grown parts of the surface. Post-ocular angulation acute, almost spiniform. Post-antennular (antennal) spine moderate, continued backwards as a ridge that does not reach to the hepatic spine. Hepatic spine smaller than the post-antennular; from the hepatic spine a well-defined, setae-grown groove, the cervical groove, runs obliquely upward and backward to near the post-rostral ridge; below the hepatic spine this groove is continued as a crescentic crease running towards the rounded, unarmed, antero-lateral angle of the carapace, which it, however, does not reach. From the hepatic spine no ridge or crest runs backward, the surface appearing here quite smooth, but between the upper part of the cervical groove and the posterior margin of the carapace still three setae-grown grooves occur, exactly like in the typical species; the anterior of these grooves runs S-like and unites dorsally with the cervical groove, the following is bifurcate, one branch running downward and slightly forward, the other backward, the posterior groove, finally, runs obliquely, between the cardiac and branchial region, but without reaching the posterior border

of the carapace. There is also a rather deep post-antennular groove, that runs into the cervical groove near the hepatic spine and a short post-ocular groove, that begins just below the 1st tooth of the rostrum, curving backward.

Abdomen twice as long as the carapace, rostrum included. First, second and third tergum smooth and rounded; one observes, however, on the 1st tergum of the male from the Kei-islands a transverse, shallow, setae-grown groove, just behind the middle, parallel with the posterior margin, narrowing laterally but not continued on to the pleura; in the other specimens it is less conspicuous. The 4th tergum is obtusely carinated, the carina defined on either side by a setae-grown shallow groove and bifurcate at the posterior end; in the specimens from the Kei-islands and in the larger female from Ternate the anterior third part of the tergum is still rounded, but in the younger female from Ternate the subdorsal grooves hardly reach beyond the middle, so that the two anterior fifths are rounded, and in the younger individuals the crest is still more reduced, appearing only posteriorly. Fifth and sixth terga sharply carinated, the former bifurcate at the posterior extremity, the latter terminating in a small acute tooth; measured along the upper edge the 6th somite appears a little more than one and a half as long as the 5th and nearly one-third longer than the greatest width. In the male from the Kei-islands (Fig. 3*b*) and in the larger female from Ternate, indeed, the 5th somite is 6 mm. long, the 6th 10,5 mm. long and 7,75 mm. broad. Telson in the female a little longer than the 6th somite, in the male hardly so; it is grooved in the middle line, the groove being narrow and extending to the 2nd lateral spinule, and on each side two other grooves are found. In the typical *Penaeopsis intermedia* the three lateral spinules of the telson are long and nearly of the same size, while the posterior almost reaches to the tip; in the indian specimens (Fig. 3*c*) the posterior spine extends only to the middle of the distance between the place of insertion and the tip, the 2nd is slightly shorter, but the anterior or 1st spine is the smallest of all, measuring only half the length of the posterior.

Antennular peduncle a trifle shorter than the antennal scale, reaching as far forward as the antero-lateral spinule of the latter; flagella subequal, the longer upper one almost half as long as the peduncle, measured from the orbital margin. External maxillipeds reaching to the far end of the antennal peduncle and as long as the peraeopods of the 1st pair; spine of the ischium a little shorter than that of the preceding joint. The peraeopods of the 2nd pair reach in the male from the Kei-islands to the middle of the 2nd antennular article, while those of the 3rd reach with the fingers beyond the antennal scale; in the larger female from Ternate they are a trifle shorter; spine at the base of 3rd pair half as long as that at the base of 2nd. The legs of the 4th pair reach in the male almost to the far end of the antennal peduncle, those of the 5th to the middle of 2nd antennular article, the 5th without exopodite.

The petasma (Fig. 3*a*) is symmetrical and ends at either side in an acuminate spout, while one observes two rounded lobes between the spouts. Figure 3*d* represents the thelycum.

The specimens, taken near Port Blair in the Andamans, that were referred by Prof. Alcock with doubt to *Penaeopsis ensis* (de Haan), probably did belong to this new variety of *Penaeopsis intermedia*.

In the Leiden Museum at present still only one type specimen of DE HAAN's *Peneus ensis* is preserved (W. DE HAAN, Fauna Jap. Crust. p. 192, Pl. 46, fig. 2). Dr. R. HORST of this Museum sent me with his usual courtesy upon my request the following information about this type specimen. In *P. ensis* an obtuse, though quite conspicuous crest runs from the hepatic spine to the posterior border of the carapace (a posteriore (spina) costa obtusa ad marginem posticum producta); the peraeopods of the 1st pair are bispinose, like in *Pen. intermedia* and the new variety, the spine of the ischium is, however, much smaller than that at the base; there is a quite distinct flattened keel on the 3rd abdominal tergum and the 4th to 6th are sharply carinated, while one observes moreover a crest on the posterior half of the 2nd; of the three lateral spinules of the telson the two posterior are rather long, like in the typical *intermedia*, the anterior only half as long; in *P. ensis*, finally, the rostrum is slightly directed upward. It is thus evident that *P. ensis* is a different species, chiefly distinguished by the obtuse crest, which from the hepatic spine runs backward, and by the stronger carination of the abdomen.

5. *Penaeopsis* sp. Pl. I, fig. 4—4*b*.

Stat. 166. August 22. 2° 28'.5 S., 131° 3'.3 E. Midway between Ceram and New Guinea. 118 m. Bottom hard, coarse sand. 5 very young specimens.

I do not succeed in determining these specimens, because they are too young, so that neither petasma nor thelycum are developed. It is a species of the Akayebi-group and most closely related to or perhaps identical with *Pen. barbatus* (de Haan) = *Pen. Akayebi* (Rathb.) from Japan. The largest specimen measures about 27 mm., the others are still younger. In all the specimens (Fig. 4) the rostrum, which is obliquely turned upward, reaches to the far end of basal antennular article, but we know that in such young individuals it is much shorter than in the adult; the rostrum is slender, tapering, straight and in all the specimens 1 + 6-dentate, the 6 teeth are equidistant, reach to the tip and from the 3rd decrease in size. Epigastric tooth a little smaller than the 1st rostral tooth. First abdominal tergum rounded, the 2nd shows in the largest specimen and in another, but not yet in the rest, a trace of a low carina on the anterior half, the 3rd and following terga are conspicuously carinated, the carina of the 3rd slightly broader than those of the following. Sixth somite (Fig. 4*a*) much elongate, in the largest specimen it is 4,6 mm. long, as long as the carapace from the orbital to the posterior margin, and $2^1/_2$-times as long as broad proximally; it is more than twice as long as the 5th and a little longer than the telson which is armed with one fixed and three movable spines at either side, while at least on the posterior half (Fig. 4*b*) much smaller spinules are implanted on the lateral margins between the three large spines and in front of them. In the youngest specimen the telson, 3 mm. long and 1 mm. broad proximally, appears even 3-times as long as broad, and the telson is here 2,56 mm. long. Telson much shorter than the uropods. We may therefore conclude that in adult specimens the 6th somite will be twice as long as broad, which fact in *Pen. barbatus* (de Haan) seems to be indeed the case, according to the figure 2 on Plate VI of KISHINOUYE's paper of 1900, representing the *Pen. velutinus* of this author, which is identical with *Pen. barbatus* and *Pen. Akayebi* (M. J. RATHBUN, in: Proc. U. S. Nat. Mus. XXVI, 1902, p. 39).

Antennular peduncle a little shorter than the antennal scale, 3rd article half as long as 2nd. The external maxillipeds reach in the largest specimen but one to the distal extremity of 2nd antennular article, in the other still younger specimens they are a little shorter. The 1st legs reach in the largest specimen just beyond the antennal peduncle and are bispinose, both the basi- and the ischiopodite being armed with a spine; legs of the 2nd pair unispinose, those of the 3rd unarmed. The 5th legs, that bear an exopodite, extend almost to the far end of 2nd antennular article. We may therefore conclude that the sea between Ceram and New Guinea is inhabited either by *Pen. barbatus* (de Haan) or by a closely allied species.

6. *Parapenaeus fissurus* (Bate).

Penaeus fissurus C. Spence Bate, Report Challenger Macrura, 1888, p. 263, Pl. XXXVI, fig. 1.
Parapenaeus fissurus J. G. de Man, Siboga Exp., Monogr. 39*a*, Part I, Family Penaeidae, 1911 (text), p. 79, 1913 (plates), Pl. VIII, fig. 25*a*, *b*.

Stat. 306. February 8. 8° 27′ S., 122° 54′.5 E. Lobetobi-strait. 247 m. Bottom sandy mud. 1 male.

This male that carries a Bopyrid in the left branchial chamber, is 110 mm. long. As a rare exception the rostrum reaches, like in the young male long 100 mm. from Stat. 302 (l. c.), to the middle of the 3rd joint of the antennular peduncle, which is just as long as the antennal scale; the rostrum is somewhat curved upward at the tip and bears besides the epigastric tooth five rostral teeth like in fig. 25*a* (l. c.), of which the foremost is almost 3-times as far distant from the apex of the rostrum as from the apex of the penultimate tooth. I observe, however, still the almost microscopical trace of a 6th tooth a little farther distant from the apex of the rostrum than from that of the foremost tooth; such a trace is also visible in fig. 25*a* of my work.

7. *Parapenaeus* sp. Pl. I, fig. 5.

Stat. 47. April 8/12. Bay of Bima, near south fort. 55 m. Bottom mud with patches of fine coral sand. 1 very young specimen.

In its outer appearance this specimen much resembles *Parap. Investigatoris* Alc. & Anderson (A. Alcock, Catal. Indian Decap. Crust. Part III. Macrura. Fasc. 1. Calcutta. 1906, Pl. VI, fig. 17), but it differs at first sight by the branchiostegal spine being very small and placed at the antero-inferior angle of the carapace. This specimen is 16,1 mm. long, the carapace, rostrum included, being 4,4 mm. long, the abdomen 11,7 mm. The rostrum that just reaches beyond the eyes, is 1 + 6-dentate, the epigastric tooth, the apex of which is as far distant from the 1st rostral tooth as the latter from the 3rd, has nearly the same size as the 1st tooth of the rostrum; the length of the rostral teeth, i. e. the distance between their apices, regularly decreases from the 2nd to the last, the distance between the apices of the 1st and the 2nd tooth is, however, a little shorter than that between those of the 2nd and 3rd; the 6th is as far distant from the tip of the rostrum as from the apex of the penultimate tooth and the line uniting the apices of the six teeth curves slightly downward. The rostrum, 1,2 mm. long, appears 4-times as long as broad at its base. Posterior to the rostrum the carapace is

rounded. Antennal spine well-developed, hepatic spine rather large; the longitudinal suture extends almost to the posterior margin of the carapace and the transverse suture is quite distinct.

First, second and third abdominal terga rounded, fourth obtusely carinated, fifth and sixth sharply, the carina of the 6th terminating in a sharp tooth; the 6th somite, 3 mm. long, has an elongate form, being 3-times as long as broad in the middle. Telson one-sixth shorter than 6th somite, 2,5 mm. long and armed, besides with a single pair of fixed marginal spines, with 2 pairs of small articulating spines in front of the former. The telson reaches to the posterior fourth of the inner uropod, outer uropod only a trifle longer than inner; telson longitudinally grooved in front of the fixed marginal spines.

Antennular peduncle a little shorter than the antennal scale, reaching as far forward as the antero-lateral spine of the latter.

The external maxillipeds reach as far forward as the basal joint of the antennular peduncle, to the middle of the antennal scale. The peraeopods of the 1st pair reach to the anterior margin of the carapace and are bispinose, the spine at the far end of the ischium twice as large as that at the base; those of the 2nd pair project to the middle of the eyes, those of the 3rd just beyond them, both unarmed at base, peraeopods of the 4th pair just as long as those of the 3rd.

8. *Sicyonia parvula* de Haan.

Sicyonia parvula de Haan, J. G. DE MAN, Siboga Exp., Monogr. 39*a*, Part I, Family Penaeidae, 1911 (text) p. 117, 1913 (plates) Pl. X, fig. 40—40*d*.

Stat. 109. July 5/6. Off Pulu Tongkil, Sulu-archipelago, plankton, at night. 1 young female.

This specimen is 15,5 mm. long (carapace 5,2 mm., abdomen 10,3 mm.) and agrees very well with the cited description, excepting only the rostral teeth. The rostrum, which near the base appears, in a lateral view, a little more than one and one-third as broad as at the denticulate tip, being here 0,33 mm. broad, near the base 0,46 mm., differs from the young female, collected at Stat. 164 (l. c. Fig. 40), by the 1st rostral tooth being placed a little more backward, so that there are three teeth on the carapace; five teeth stand on the upper margin of the rostrum, of which the anterior one is strongly curved downward and projects a little beyond the acute tip of the rostrum that is also curved downward, while the tooth of the lower margin extends likewise a little beyond the tip. The apex of the 3rd carapacial tooth (which in Fig. 40 is placed above the orbital margin) is a little more than one and a half as far distant from the 1st rostral tooth as the latter from the 2nd; the distances between the apices of the following teeth regularly diminish in length. The two posterior teeth on the carapace are placed as in Fig. 40.

The longitudinal, slightly curved-ridges that define the abdominal pleura superiorly, are well-developed on the 2nd, 3rd, 5th and 6th somites, but are wanting on the 1st and the 4th; according to the cited description they should be conspicuous on the three first, but indistinct on the three posterior.

The thelycum much resembles that of *Sic. ocellata* (J. G. DE MAN, l. c. Fig. 43), but

the terminal spine appears more slender and reaches until the 1st pair of legs. This specimen bears some resemblance to *Sic. trispinosa* de Man, but in the latter the 1st carapacial tooth is much shorter, not longer than the 2nd, the pleura of the 1st abdominal somite show two transverse furrows and probably will the male of *Sic. parvula* also differ.

9. *Sicyonia laevis* Bate. Pl. I, Fig. 6, 6*a*.

Sicyonia laevis Sp. Bate, J. G. DE MAN, Siboga Exp., Monogr. 39*a*, Part I, Family Penaeidae, 1911 (text) p. 118, 1913 (plates) Pl. X, fig. 41—41*b*.

Stat. 7. March 11. 7° 55′.5 S., 114° 26′ E. Near reëf of Batjulmati (Java). 15 m. and more. Bottom coral and stones. 1 female.

This female has the same size as that from the south coast of Manipa-island, described by me in 1911, because it is also 17 mm. long (carapace, rostrum included, 6,2 mm., abdomen 10,8 mm.). The rostrum, which reaches to the middle of 2nd antennular article, slightly directed upward, is armed above with five teeth; the 1st stands on the carapace like in the female from Manipa-island and the apex of the tooth reaches just beyond the orbital margin; this tooth and the two following are of the same size, but the 4th and the 5th are a little smaller and the 5th that is slightly curved downward, projects not only (Fig. 6) beyond the small acute apex of the rostrum but even a little beyond the tooth of the lower margin. Near the lower margin at either side, on the distal half of the rostrum, four short spiniform setae are implanted. The distinctly narrowing rostrum appears in a lateral view 0,7 mm. broad at base, while the tip is 0,3 mm. broad, being near the base more than twice as broad as on the level of the 4th rostral tooth. In the female from Manipa-island the upper margin presented only four teeth and between the broken apex of the rostrum and the tooth of the lower margin a rounded prominence was observed, tipped with a tuft of setae. The two other carapacial teeth agree with my figure 41, the distance between their apices being slightly longer than the distance between the apex of the 2nd and that of the 1st rostral tooth.

Outer orbital angle angular, obtuse; in the Challenger type that was 30 mm. long, the angle was spiniform, "produced to a point".

The abdomen agrees with the female from Manipa-island, but of the two small acute teeth on the postero-inferior angle of the 4th pleura the upper is much larger than the lower. External maxillipeds a little shorter than the antennal scale. Peraeopods of the 1st pair bispinose. The spine of the thelycum (Fig. 6*a*) reaches to the posterior border of the 2nd legs. Median spines on the abdominal sterna well-developed.

10. *Sicyonella inermis* (Paulson). Pl. I and II, Fig. 7—7*h*.

Aphareus inermis O. Paulson, Izslyedovaniya Rakoobraznuikh Krasnagho Morya. Chast. I. Kiev, 1875, p. 117, Pl. XVIII, figs. 3—3*n*.

Sicyonella inermis H. Balss, Die Decapoden des Roten Meeres. I Macruren, Wien 1915, p. 14, figs. 10—15 (ubi literatura).

Stat. 41. April 3. 7° 25′ S., 117° 50′.5 E. Plankton. Surface to 10 m. 2 specimens.

The two specimens are of equal size, 13,4 mm. long (carapace 3 mm., abdomen 10,4 mm.).

Of the two teeth with which, in both specimens, the rostrum (Fig. 7, 7*a*) is armed, the posterior appears slightly longer and a little more slender than the anterior and the distance between their apices is nearly twice as large as the distance between the apex of the anterior tooth and that of the rostrum; the distance between the apex of the rostrum and that of the posterior tooth measures about one-sixth the length of the carapace, rostrum included. Supra-orbital and hepatic spine well-developed, of equal size, larger than the small branchiostegal spine.

Abdominal terga rounded, their posterior border truncate, excepting the 6th somite which is laterally strongly compressed, the upper margin, however, not carinated and terminating in a short acute spine; the 6th somite, 2,36 mm. long, is twice as long as broad and a little more than twice as long as the fifth. Telson 1,76 mm. long, three-fourths the length of the 6th somite, somewhat shorter than the inner uropod, that is almost as much shorter than the outer; there are still only four pairs (Fig. 7*b*) of small marginal spinules.

The eye-peduncles, namely their terminal joint, measure a little more than one-third the length of the carapace and the diameter of the globular eye measures one-third the length of the peduncle.

The acute spine (stylocerite) on the outer margin of basal antennular article, a little behind the middle, is well-developed, like also the spine at the distal extremity, which is directed outward, while the third spine, that rises from the upper surface just in front of the statocyst and behind the stylocerite, is quite conspicuous in a lateral view (Fig. 7*a*) of the animal. Second joint in the female 0,42 mm. long, 0,24 mm. broad, proportion between length and width like 7 : 4; 3rd joint a little shorter, 0,3 mm. long and twice as long as wide in the middle. Both the inner and the outer margin of the 1st and 2nd antennular article are fringed with rather long setae, shorter setae occur also on the inner margin of the 3rd article; in both specimens the 3rd article reaches by one-third its length beyond the antennal scale. Outer flagellum thickened at base, the thickened part 0,5 mm. long and with sensory filaments along its whole length. Second antennal article with a spine, which is nearly of the same size as the branchiostegal spine, antennal peduncle reaching as far forward as the stylocerite, a little shorter than the eye-peduncle and of a stout shape, the terminal joint twice as long as broad; flagellum in the female 15,7 mm. long, only one-sixth longer than the body, with the abrupt double bend at three-sevenths of its length from the base, like in the male, long 20 mm., described by Dr. Calman in 1913, but in this male the flagellum was more than twice as long as the body, owing to it being adult.

In both specimens the third maxillipeds are still only one-fifth longer than the carapace owing to their young age and reach only as far forward as the antennal scale. In neither specimen (Fig. 7*c*) I did succeed in observing the subdivision of the two distal segments, which for the rest agree with Calman's figure 9 in his paper of October 1913. In the male the antepenultimate segment is 0,7 mm. long, the penultimate is just as long, while the terminal joint is a little shorter, measuring 0,5 mm.

The peraeopods of the 1st pair (Fig. 7*d*) reach to the anterior border of the carapace, carpus 0,5 mm. long, chela 0,62 mm. long, 5-times as long as wide, fingers little shorter than palm. The peraeopods of the 2nd pair (Fig. 7*e*) extend to the far end of the antennal peduncle, their merus

is 0,7 mm. long, carpus 0,86 mm., chela 0,74 mm. (palm 0,42 mm., fingers 0,32 mm.); chela 6-times as long as wide. The legs of the 3rd pair (Fig. 7*f*) reach a little beyond the eye-peduncles; merus 0,8 mm. long, carpus 1,32 mm., chela 0,93 mm. (palm 0,57 mm., fingers 0,36 mm.); chela 8—9-times as long as wide. These numbers show that the fingers are relatively shorter in the 3rd than in the 2nd legs and also relatively shorter in the 2nd than in the 1st and that the chelae appear gradually of a more slender shape from the 1st to the 3rd.

The peraeopods of the 4th pair (Fig. 7*g*) reach to the anterior border of the carapace; their merus is in the male 0,72 mm. long and 0,11 mm. broad, $6^1/_2$-times as long as wide; carpus 0,6 mm. long, 0,094 mm. broad; propodus 0,5 mm. long, 0,084 mm. wide, carpus and propodus also 6-times as long as wide; dactylus long 0,26 mm., nearly half as long as the propodus, 0,05 mm. wide at base. The peraeopods (Fig. 7*h*) of the 5th pair, finally, reach a little less forward than those of the 4th, but show exactly the same measurements.

The two branches of the petasma are not yet united and still little developed; they are 0,3 mm. long, 3- or 4-lobate, with rounded lobes; the protopod of the pleopods of the 1st pair is 0,8 mm. long, the exopod twice as long.

This rare Crustacean, that according to Nobili, Calman and Balss belongs to the Sergestidae, was already known from the Red Sea (Coast of Erythraea), the Cargados Carajos, the Maldives and Torres Straits.

Family ALPHEIDAE.

11. *Ogyrides Sibogae* (de Man). Pl. II, Fig. 8—8*g*.

Ogyris Sibogae J. G. de Man, Siboga Exp., Monogr. 39*a'*, Family Alpheidae, 1911 (text) p. 135, 1915 (plates). Pl. I, Fig. 1—1*h*.

7 specimens, 3 of which are provided with eggs, collected by the Siboga expedition at Ambon at a depth of 54 m.

Among the characters by which *O. striaticauda* Kemp of the Chilka Lake is distinguished, STANLEY KEMP (in: Mem. Indian Mus. Vol. V, 1915, p. 288) adduces the existence on the ventral surface of the telson of "four oblique ridges, the three anterior ones placed close together, the other rather more distant" and the specific name is apparently derived from this character. The examination of the present specimens of *O. Sibogae* now proved at once that these ridges occur also in this species; the three anterior ones are placed exactly like in the species of the Chilka Lake, but the fourth or posterior was not observed (Pl. II, Fig. 8).

The type specimen on which this species was founded by me in 1910 and which was captured in the Sulu-Sea at a depth of 535 meter, was 18 mm. long; the present specimens, though apparently adult, because they are ova-bearing, are of a smaller size, about 13 or 14 mm. long from tip of rostrum to tip of telson. They fully agree with the description of 1911, but the eye-peduncles are not shorter, but as long or, in the ova-bearing females, even a trifle longer than the carpocerite, reaching by half the cornea beyond it, a difference perhaps owing to their smaller size.

In 4 specimens, one of which is provided with eggs, the carapace is armed anteriorly with three spiniform teeth, in the three others with four as in the type; in the egg-bearing female, the peraeopods of which have been figured, the 3rd or posterior spine is a little farther distant from the 2nd as the 2nd from the 1st, in another ova-bearing female the 2nd spine is placed a little nearer to the posterior than to the anterior.

Figure 8*b* represents the scaphocerite of one of the egg-bearing females, it shows a different form from that of *O. striaticauda*, the lamella being in the latter species truncate distally, which is not the case in *O. Sibogae*. Of this female the five peraeopods are figured, $2^1/_2$-times more strongly magnified than in the Siboga Monograph. The measurements taken

along the upper margin of the joints are the following. Of the 1st pair (Fig. 8*c*) the merus is 1,08 mm. long, wide in the middle 0,23 mm., proportion 4,7; carpus 1,25 mm. long, 0,235 mm. wide at the distal extremity, proportion 5,3; chela 0,8 mm. long (palm 0,32 mm., fingers 0,48 mm.). Of the 2nd pair (Fig. 8*d*) the merus is 1,48 mm. long, 0,2 mm. wide in the middle, proportion 7,4; 1st segment of the carpus 0,92 mm. long, 0,16 mm. thick at the distal extremity, 6-times as long as thick distally; 2nd segment 0,3 mm. long, 3rd 0,24 mm., 4th 0,44 mm., entire length of the carpus 1,9 mm., 1,28-times as long as the merus; chela 1 mm. long (palm 0,44 mm., fingers 0,56 mm.). Different from the type the 1st segment is a little shorter than the three following taken together and has a somewhat less slender shape, like also the merus. In another female with eggs the merus proved to be 1,36 mm. long and 0,18 mm. broad, proportion 7,5; carpus 1,87 mm. long, 1,37-times as long as the merus, the segments being from the 1st to the last respectively 1 mm., 0,25 mm., 0,22 mm. and 0,4 mm. long, the 1st segment 0,14 mm. thick at the distal extremity; chela 0,78 mm. long (palm 0,36 mm., fingers 0,42 mm.). In this female the 1st segment is a trifle longer than the three following taken together and also, like in the type, appears more slender than in the first.

Of the 3rd pair the merus (Fig. 8*e*) is 0,96 mm. long, its greatest width, anteriorly there where the spine is implanted, 0,28 mm., proportion 3,4; carpus long 0,66 mm. and 0,22 mm. broad, proportion 3; propodus long 0,44 mm., broad 0,2 mm. proximally, 2,2-times as long as broad; dactylus 0,34 mm. long, 0,04 mm. broad, 8-times as long as broad. The relative dimensions of merus, carpus and propodus are therefore: merus 1,45; carpus 1; propodus 0,66.

Of the 4th pair (Fig. 8*f*) the ischium is 1,1 mm. long; the merus 1,4 mm. long, 0,22 mm. wide, proportion 6,4; carpus 0,92 mm. long, 0,18 mm. broad, proportion 5,1; propodus 0,82 mm. long, 0,14 mm. broad in the middle, proportion 5,7; dactylus 0,26 mm. long, 0,035 mm. broad, proportion 7,4. The relative measurements are: merus 1,52; carpus 1; propodus 0,9.

Of the 5th pair, finally, the slender ischium (Fig. 8*g*) is 1,8 mm. long, in the middle 0,08 mm. thick, proportion 22, while it is 0,12 mm. thick at the distal extremity; merus 0,9 mm. long and 0,12 mm. broad in the middle, proportion 7,5, the merus is, however, 0,13 mm. thick at the distal extremity; carpus long 0,4 mm., 0,16 mm. thick at the distal extremity, proportion 2,5; propodus 0,62 mm. long, 0,18 mm. broad in the middle, proportion 3,4; dactylus 0,46 mm. long, 0,073 mm. broad at base, proportion 6,3. The relative measurements are: merus 2,25; carpus 1; propodus 1,55. Ischium twice as long as merus.

Eggs globular, diameter 0,18—0,2 mm.

O. striaticauda Kemp appears closely related, but apparently differs by the larger (7 to 9) number of forwardly directed spines on the carapace, by the absence of the posterior ridge on the ventral surface of the telson and apparently by some slight differences in the measurements of the peraeopods. The scaphocerite has another form and there are probably still other differences. According to Mr. Kemp's description the telson should not possess a feeble lateral prominence, l. c. p. 288, but in the text-figures *f* and *g* such a prominence is visible, appearing in Fig. *f* as much developed as in *O. Sibogae*.

General distribution: Sulu Sea (de Man). A probable variety occurs east of Dangar Besar, Saleh-bay.

12. *Athanas Naifaroensis* Cout. Pl. II, Fig. 9.

Athanas Naifaroensis H. Coutière, Alpheidae Mald. and Laccad. Archip., 1905, p. 859, fig. 131.

Stat. 213. September 26—October 26. South-Island near Saleyer. Reef. 1 male.

This specimen is 7,7 mm. long from tip of rostrum to end of telson, the carapace, rostrum included, measuring 2,9 mm., the abdomen without the telson 3,9 mm., the telson 0,9 mm.

Rostrum 0,85 mm. long, almost half as long as the rest of the carapace, reaching (Fig. 9) to the far end of 2nd antennular article; its greatest width, at one-third its length from the base, 0,23 mm., is almost one-fourth the entire length; from here to the base the margins are slightly concave, parallel, while in front of it the margins, also a little concave, converge to the acute tip. Supra-corneal spine reaching, looked at from above, to the middle of the eye, extra-corneal spine very long, extending beyond the eye to the middle of the rostrum, infra-corneal spine very small, hardly projecting beyond the eye. Second joint of antennular peduncle a little, one-fifth, shorter than 3rd; stylocerite reaching to the far end of 2nd.

The measurements of the three posterior legs in millimeters are the following:

	Third legs	Fourth legs	Fifth legs
Length of merus	0,92	0,74	0,74
Width of merus	0,2	0,154	0,16
Length of carpus	0,52	0,4	0,55
Width of carpus at distal end .	0,15	0,13	0,126
Length of propodus	1,1	0,86	0,94
Width of propodus	0,125	0,11	0,115
Length of dactylus	0,32	0,28	0,32
Width of dactylus at base . .	0,06	0,054	0,06

The relative measurements are therefore for the 3rd pair: merus 1,8, carpus 1, propodus 2,1; for the 4th pair merus 1,85, carpus 1, propodus 2,15; for the 5th pair merus 1,35, carpus 1, propodus 1,7.

I would still observe that the dactylus of the measured leg of the 4th pair bears a very small, ventral, accessory tooth just beyond the middle, its fellow of the 4th pair is lost, in the other legs the dactylus is simple.

The endopodite of the 2nd pleopod bears two appendices, the appendix masculina reaching almost to the apex of the branch and with 5 spiniform setae on the tip, the stylamblys, which is much shorter and furnished with 6 cincinnuli. As the male of this species is still unknown, it is to be regretted that the first pair of legs are wanting.

General distribution: Naifaro Reef, Hulule Male Atoll (Coutière).

13. *Athanas parvus* de Man.

Athanas parvus J. G. de Man, Siboga Exp., Monogr. 39*a'*, Part II, Family Alpheidae, 1911 (text) p. 148, 1915 (plates) Pl. I, Fig. 4—4*d*.

Stat. 273. December 23/26. Anchorage off Pulu Jedan, East coast of Aru-islands. (Pearl-banks) 13 m. Bottom sand and shells. 1 specimen.

This specimen, of which I did not succeed in examining the 2nd pleopod, so that it remains uncertain whether it is a female or the still unknown male, has nearly the same size as the egg-bearing female, on which this species was founded by me in 1910, being 6,3 mm. long from tip of rostrum to end of telson; the carapace and the abdomen, rostrum, respectively telson included, measure 2,26 mm. and 4,04 mm. The rostrum, which is 0,72 mm. long measured from the level of the orbital margin to the tip, almost half as long as the rest of the carapace, extends just beyond the 2nd antennular article and the tip is slightly turned upward; the lateral margins are not straight as in Fig. 4 of my work, but very slightly convex along the two posterior thirds and very slightly concave distally, so that the form is somewhat different, and they make a distinct angle with the orbital margin of the carapace; at the level of these angles, thus a little in front of the orbital margin, the rostrum is 0,24 mm. broad. Looked at from above the extra-corneal spine hardly projects beyond the eye, the infra-corneal reaches almost its anterior margin, just like in Fig. 4; in a lateral view the extra-corneal spine reaches the tip of the eye, the other almost just as far.

Eyes black, distinctly faceted. The 2nd joint of the antennular peduncle appears in this specimen as long as wide and but a little shorter than the 3rd, the stylocerite extends almost to the distal margin of the 2nd joint, the terminal spine of the scaphocerite, finally, appears more slender than in Fig. 4, being $2^1/_2$-times as long as wide at its base.

Telson 0,72 mm. long, just as long as the rostrum, 4-times as long as the distance between the postero-lateral angles is wide, this distance half as broad as the width at base. Legs of the 1st pair like in the type, equal. Merus 5-times as long as wide, carpus measuring two-thirds the length of the merus, 3-times as long as thick at the distal end, chela not longer, but a trifle shorter than the merus, the proportion being like 1 : 0,95; measured in the plane of the fingers, the chela proves to be 4,1-times as long as wide, proportion between the length of the fingers and that of the chela like 1 : 2,2.

Merus of 2nd legs 6,4-times as long (0,64 mm.) as wide (0,1 mm.), carpus 1,4-times as long as the merus, the 5 segments are respectively 0,38 mm., 0,11 mm., 0,11 mm., 0,11 mm. and 0,18 mm. long; chela 0,38 mm. long, as long as the 1st segment, fingers as long as the palm.

Ischium of 3rd legs with two spines on the posterior margin, the posterior a little longer than the other. Relative dimensions of 3rd pair: merus 1,9, carpus 1, propodus 2,05; merus 6,4-times, propodus 9,7-times as long as wide, carpus 3,8-times as long as thick at distal end; propodus with four short spinules besides two at the distal end, of which the longer is half as long as the dactylus and almost one-sixth the length of the propodus. The dactylus, which is $6^2/_3$-times as long as broad at its base, measures more than one-third of the propodus, the proportion being like 16 : 39; ventral hook half as long as the principal, the latter little more than twice as wide at its base as the ventral, the proportion being as 7 : 3.

Ischium of 4th legs also with two spines on the posterior margin, but the anterior comparatively shorter than in the 3rd pair. Relative dimensions of 4th legs: merus 1,94, carpus 1, propodus 2,22. Merus 6-times, propodus 9-times as long as wide, carpus 3,5-times as long as

thick at the distal end; propodus with five spinules besides the two at the distal end. Dactylus almost half as long as the propodus, the proportion being like 16 : 35,5; they resemble those of the 3rd pair. Fifth legs lost.

The slight differences as regards the measurements, when compared with those of the type, are probably owing to the younger age of this specimen or they are individual.

General distribution: South coast of Timor (DE MAN).

14. *Athanas Stebbingii* de Man. Pl. II and III, Fig. 10—10*f*.

Athanas Stebbingii J. G. de Man, in: Zoolog. Mededeelingen uitgeg. vanwege 's Rijks Museum v. Nat. Hist. te Leiden. 1920. Dl. V, afl. 3, p. 106.

Stat. 323. February 24/25. Sangkapoera-roads, Bawean-island., 12 m. Bottom mud. 1 egg-bearing female.

A new species of the *Dimorphus*-group, which I had the honour to dedicate to the author of the series of interesting and valuable papers on the carcinological Fauna of South Africa and who at the age of 87 is still continuing his researches with youthful zeal and diligence. This species, closely related to *A. dimorphus* Ortm. and also to the female of the remarkable *A. polymorphus* Kemp of the Chilka Lake, is of a smaller size than these two, being only 9,66 mm. long from tip of rostrum to tip of telson: the carapace is 3,7 mm. long, the abdomen 5,96 mm. The triangular acuminate rostrum (Fig. 10), that reaches about to the distal extremity of the 2nd joint of the antennular peduncle, measures one-third the rest of the carapace and projects by more than half its length beyond the eyes; the rostrum is sharply carinate above, the carina ends, however, at the base; the lateral margins are also sharp, they do not reach, however, to the tip, fading away at the anterior fourth, and the height of the rostrum, in a lateral view, is nearly $^1/_7$ the length. Supra-corneal teeth wanting. Extra-corneal spine acute, reaching to the middle of the eyes. Infra-corneal angle rounded, reaching almost as far forward as the extra-corneal spine. Antero-lateral angle of the carapace rounded, unarmed.

Abdomen about one and a half as long as the carapace, the telson, respectively the rostrum included; abdominal pleura with their inferior margin straight, rounded posteriorly, except that of the 5th somite, which is acutely pointed, while the infero-posterior angle of the 6th is articulated and also acute. Telson (Fig. 10*a*) 1,16 mm. long, measuring one-fourth the rest of the abdomen, $1^3/_4$-times as long as the greatest width at base, while the distance between the postero-lateral angles is nearly half the width proximally. Dorso-lateral spinules implanted near the lateral margins that are almost straight, those of the anterior pair, 0,11 mm. long, just before the middle, those of the posterior, 0,12 mm. long, at the posterior third; posterior margin rounded, slightly prominent, the inner of the two pairs of spinules 0,2 mm. long, the outer 0,08 mm. Basal joint of uropods bispinose posteriorly, the outer spine 5-times as long as the inner. Uropods of equal length, slightly longer than the telson without the terminal spinules, but reaching as far backward as the latter; like in *A. polymorphus* Kemp there is a fringe of feathered setae on the under side of the exopodite, close to and parallel with the straight outer margin; the outer margin of the endopodite, that is a little less broad, appears in the middle a little concave, anteriorly a little convex.

Eyes 0,5 mm. long, $^1/_7$ the length of the carapace, rostrum included, facets rather large, pigment deep black.

Measured from the orbital margin of the carapace, the basal segment (Fig. 10) of the antennular peduncle proved to be 0,74 mm. long, one-fourth longer than the 2nd and 3rd taken together; longitudinal crest with terminal spine on the infero-internal margin as in *A. polymorphus*; the 2nd segment, 0,26 mm. long and 0,29 mm. broad, little broader than long, measures one-third of the 1st, the 3rd, finally, 0,35 mm. long and 0,26 mm. broad, is one-third longer than the 2nd, but a trifle less broad. The fused part of the outer antennular ramus, 0,4 | or 0,42 mm. long, is nearly as long as the 3rd segment of the peduncle and composed of three joints of which the 1st or proximal appears as long as the two following that are subequal, taken together, the 3rd being only a trifle longer than the 2nd; the thicker one of the two branches, the olfactory filaments of which are well developed, is nearly as long as the fused part, while the other branch is much longer; the inner antennular ramus is considerably longer. Stylocerite large, acuminate, reaching almost to the middle of 3rd antennular article, outer margin slightly curved. The statocysts are in communication with the exterior by a wide aperture on the postero-external part of the upper surface of the basal segment and I observed in each a black rounded particle; both particles are of the same size, 0,08 mm. broad, and apparently act as statoliths. The two statoliths being of the same form, size and colour, it appears improbable, that they have been introduced by the animal, but I do not venture to give any opinion about their origin.

Second segment of antennal peduncle with a spine at the infero-external angle that reaches to the distal margin of the 1st joint of the antennular peduncle, carpocerite as long as this peduncle; scaphocerite 0,96 mm. long, 0,54 mm. broad, almost twice as long as broad and a little longer than the antennular peduncle, outer margin straight, terminal spine reaching a little beyond the rounded tip of the lamella.

The outer maxillipeds reach to the distal extremity of the antennular peduncle, the terminal joint is twice as long, but not stouter than the penultimate.

The peraeopods of the 1st pair (Fig. 10*b*, 10*c*) are very nearly equal and project by the chela and half the carpus beyond the antennal scale. Merus of the right leg one and a half, that of the left one and one-third as long as the ischium and 6-times as long as broad; carpus slightly shorter than merus, the proportion being like 15 : 17, and 5-times as long as thick at the distal end; chela but a trifle shorter than carpus, fingers measuring three-fifths of the palm. Except the usual tufts of setae on the fingers these legs appear nearly glabrous, the few setae that one observes on the joint being extremely short and fine.

The peraeopods of the 2nd pair (Fig. 10*d*) are also equal or very nearly so. Carpus composed of five segments, nearly one and a half as long as the merus; the 1st segment as long as the four following together and a little more than 6-times as long as thick at the distal extremity; the three following joints are equal or very nearly so and a trifle less broad than long; 5th segment a trifle longer than the two preceding taken together and almost 3-times as long as thick; chela measuring about one-third the length of the carpus, fingers of the right leg a trifle longer, of the left a trifle shorter than the palm.

The three following legs regularly diminish in length and stoutness. The ischium of the legs of the 3rd (Fig. 10*e*) and 4th pair are armed with one or two spines inferiorly, but not that of the 5th; for the rest these legs are nearly unarmed. Carpus of 3rd pair three-fifths of the merus, 4-times as long as thick distally; propodus almost twice as long as the carpus, 9-times as long as wide, its posterior margin with 7 or 8 small spinules and with a much longer spine, long 0,2 mm., at the distal extremity, almost half as long as the dactylus; dactylus simple, not biunguiculate, slightly curved near the tip, measuring one-third of the propodus and 6-times as long as broad at its base. The legs of the 4th pair nearly agree with those of the 3rd; in those of the 5th (Fig. 10*f*) the carpus measures two-thirds of the merus and a little more than half the length of the propodus, which bears tufts of setae, not found in the two preceding pairs, on the distal fourth of the lower margin, and at the distal end the long spine, that also exists on the propodus of the 3rd and 4th pair.

The endopodite of the 2nd pleopod bears only one appendix, the stylamblys. Only 3 or 4 ova were still preserved, they are small, 0,5 mm. long.

Athanas dimorphus Ortm. differs by the shorter rostrum that reaches only to the far end of the basal antennular article, by the infra-corneal angle being acute, not rounded, by the telson being broader posteriorly and by the much shorter chela of the 1st peraeopods of the female, that is but little more than half as long as the carpus. The female of *A. polymorphus* Kemp differs also by the acute infra-corneal angle, by the existence on the carapace of a sharp tooth opposite to the insertion of the antennae, by the 2nd joint of the antennular peduncle being not shorter, but almost twice as long as the 3rd, by the shorter stylocerite, by the shorter chela of the 1st pair of legs, in which the fingers are as long as the palm etc.

Measurements in millimeters.

Table A.

Length of telson	1,16
Width of telson at base	0,65
Distance between the postero-external angles	0,34
Distance between the posterior margin of 6th somite and the anterior pair of dorso-lateral spinules	0,52
Distance between the posterior margin of 6th somite and the posterior pair of dorso-lateral spinules	0,8

Table B.

	Right leg of the 1st pair	Left leg of the 1st pair	Third leg	Fourth leg	Fifth leg
Length of ischium	0,9	1			
Length of merus	1,36	1,35	1,24	1,14	0,92
Width of merus	0,23	0,22	0,24	0,24	0,19
Length of carpus	1,2	1,2	0,75	0,65	0,66
Width of carpus distally	0,24	0,22	0,18	0,18	0,175
Length of chela	1,14	1,12			
Length of palm	0,72	0,7			
Length of fingers	0,42	0,42			
Length of propodus			1,4	1,22	1,22
Width of propodus			0,15	0,14	0,14
Length of dactylus			0,45	0,45	0,42
Width of dactylus at base			0,08	0,08	0,085

Table C.

Measurements of the carpus and chela of the 2nd legs.

	Right leg	Left leg
Length of 1st segment	0,8	0,76
Width at distal extremity	0,12	0,12
Length of 2nd segment	0,14	0,14
Width of 2nd segment	0,12	0,12
Length of 3rd segment	0,14	0,14
Width of 3rd segment	0,12	0,12
Length of 4th segment	0,16	0,14
Width of 4th segment	0,12	0,12
Length of 5th segment	0,32	0,32
Width of 5th segment	0,126	0,12
Length of chela	0,56	0,54
Length of palm	0,26	0,3
Length of fingers	0,3	0,24

15. *Athanas Djiboutensis* Cout.

Athanas Djiboutensis H. Coutière, Alpheidae Mald. and Laccad. Archip. 1905, p. 856, fig. 129.

Stat. 172. August 26/28. Anchorage between the island of Gisser and Ceram-Laut. Reef. 1 sp.

Though it has lost the legs of 1st pair, this specimen certainly belongs to *A. Djiboutensis*, which is easily distinguished by the infra-corneal spine being much larger and much more prominent than the extra-corneal. Entire length 7,12 mm. from tip of rostrum to tip of telson, the carapace, rostrum included, measuring 2,8 mm., the abdomen 4,32 mm. The rostrum, just as long as the telson, measures almost half the length of the rest of the carapace and reaches to the far end of 2nd antennular article; the lateral margins run parallel along the proximal third and from here converge to the acute tip, while the rostrum is carinate above. Viewed from above the extra-corneal spine reaches to the middle of the eye, the supra-corneal spine is a little shorter and the infra-corneal is almost as long as the eye; in a lateral view the latter appears as long as the eye, the extra-corneal appears only half as long, reaching a little more forward than the supra-corneal spine.

Telson 0,88 mm. long, 3-times as long as the distance (0,28 mm.) between the postero-lateral angles and twice as long as the width at the base; posterior margin rounded, a little prominent, fringed with long feathered setae and with two spines at either side, of which the longer inner ones are 0,15 mm. long. Dorso-lateral spinules, the anterior 0,1 mm. long, the posterior 0,12 mm., the former just before the middle, the latter about at the posterior third.

Merus of the peraeopod of 2nd pair 0,76 mm. long, 4-times as long as broad, showing the greatest width at the posterior third and somewhat narrowing distally; 1st segment of carpus 0,5 mm. long, 2nd 0,1 mm., 3rd 0,12 mm., 4th 0,14 mm., 5th 0,24 mm., half as long as the 1st, the entire length 1,1 mm., so that the carpus is one and a half as long as the merus; chela 0,4 mm. There is still one of the three posterior legs lying loose in the tube, probably

a leg of the 3rd pair. Ischium with two spines on the posterior margin. Merus 0,76 mm. long, 0,17 mm. broad, 4,5-times as long as broad; carpus 0,4 mm. long, 0,135 mm. thick distally, 3-times as long as thick; propodus 0,84 mm. long, 8-times as long as broad, with 4 or 5 minute spinules on the posterior margin and a longer spine, nearly half as long as the dactylus, at the distal extremity; dactylus 0,3 mm. long, 5-times as long as broad at base, simple; the relative dimensions are therefore: merus 1,9; carpus 1; propodus 2,1.

16. *Arete Iphianassa* de Man. Pl. III, Fig. 11—11*f*.

Arete Iphianassa J. G. de Man, Siboga Exp., Monogr. 39*a*[1], Part II, Family Alpheidae, 1911 (text) p. 164, 1915 (plates) Pl. III, fig. 11, Pl. IV, fig. 11*a*—11*e*.

Stat. 213. September 26—October 26. South-Island near Saleyer. Reef. 1 male and 1 ova-bearing female.

It is with some doubt that these two specimens are referred to *Ar. Iphianassa*, because they show some differences from the original description: as this description, however, was founded only on one male, one egg-laden female and one young specimen, the observed differences may afterwards once prove to be owing to individual or to local variation, while they are of too little importance to justify the creation of a new species.

The male is 8,6 mm. long from tip of rostrum to tip of telson, while the female appears as long as the type specimens that measured 9,5 mm. The carapace of the male, measured from the orbital to the posterior margin, is 2,72 mm. long, the abdomen 5 mm., while the rostrum, measured in a horizontal plane, proves to be 0,88 mm. long. The rostrum, that reaches almost to the distal extremity of the antennular peduncle, is 3,6-times as long as wide at the middle of the eyes; from the acute apex the lateral margins diverge straight backward to just behind the anterior border of the eyes, then they run parallel and finally curve into the orbital margin; the rostrum, that is slightly directed downward, resembles that of the type (J. G. DE MAN, l. c. fig. 11), but extends to just beyond the apex of the stylocerite. The rostrum of the female (Fig. 11) is as long as in the male, also slightly directed downward, but the straight lateral margins diverge from the apex almost to the base, running not parallel at the level of the eyes. The spine at the outer angle of the orbits projects distinctly beyond the eyes, both in the male and in the female, by one-third its length.

The telson of the male is 1,06 mm. long, 4,4-times as long as the posterior margin is wide, while the width at the base, 0,65 mm., is 2,7-times as broad as the posterior margin. The fused part of the outer antennular flagellum is composed in the male (Fig. 11*c*) of four segments, of which the 1st and 2nd are equal and nearly as long as wide distally, the 3rd and 4th also equal, but about one and a half as long as wide; in the female (Fig. 11*d*) the 1st segment is one and a half as long as wide distally, the 2nd is half as long as the 1st and a little wider than long, the 3rd and the 4th are equal and nearly of the same size and shape as the 1st. In *Arete indicus* Cout. the fused part is composed of six segments which, according to the figure, should be nearly equal and broader than long (H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 864, fig. 134*a*).

Of both chelipeds of the male (Fig. 11*e*) the ischium bears on the dorsal border two obtuse prominences, one contiguous to the merus, the other, half as large, on the middle; on each prominence a spine is implanted, the spine of the distal prominence is one-fourth longer than the other. Besides these two spiniferous prominences, that are also found in *Ar. Iphianassa* (J. G. DE MAN, l. c. fig. 11*a*, 11*b*), the ischium of both chelipeds is armed on the opposite lower side with a large, subacute, probably compressed tooth, of the same size as the distal prominence of the upper border; unfortunately the ischium of the type specimens has not been described and on the figures 11*a*, 11*b* the tooth is not visible, so that I cannot say whether it occurs also in the typical *Ar. Iphianassa*. Merus and carpus like in the type species, but the crest by which the hollowed lower surface of the carpus is bounded at the inner side is quite unarmed, not ending into an acute tooth. The large chela (Fig. 11*e*, 11*f*) of the male resembles that of the type, but the denticulation of the fingers is somewhat different. The single tooth of the dactylus is rudimentary, only represented by a very low, rounded prominence, and between it and the articulation there are still 2 or 3 very small, subacute, microscopical teeth; the large tooth on the middle of the immobile finger is not directed obliquely forward, but truncate and the free edge a little excavate; it is separated by a semicircular emargination from the much smaller, proximal tooth that is also truncate and this tooth is separated by a much lower and smaller notch from the smooth sharp edge that extends between this notch and the articulation. The other chela of the male resembles also that of the type (Fig. 11*b*), but one observes nearly on the middle of the cutting-edge of the dactylus a very small obtuse tooth and between it and the articulation 6 or 7 much smaller, microscopical though sharp teeth.

The chelae of the female are very nearly equal and apparently do not differ from those of the type.

The following legs of the male proved to be a little more slender than in the type. Merus of the 2nd pair 0,9 mm. long, 4,2-times as long as wide in the middle. Carpus 1,1 mm. long, the four segments from the 1st to the last 0,55 mm., 0,15 mm., 0,13 mm., 0,27 mm.; the 1st segment 3,6-times as long as thick at the distal extremity; the 4th segment being 0,16 mm. broad near the articulation with the chela, the carpus proves to be 7-times as long as wide at its distal extremity. Chela 0,61 mm. long (palm 0,32 mm., fingers 0,29 mm.).

Merus of the 3rd pair 1,3 mm. long, 0,28 mm. wide in the middle, proportion 4,6; carpus 0,72 mm. long, 0,22 mm. thick at the distal extremity, proportion 3,3; propodus 1,25 mm. long, 0,18 mm. broad in the middle, proportion 7, with 11 short spinules along its whole length besides the 2 longer ones at the distal extremity; dactylus 0,34 mm. long, 0,094 mm. broad at base, proportion 3,7. Relative measurements: Merus 1,8, carpus 1, propodus 1,74; merus 1,04-times as long as the propodus, dactylus a little more than $^1/_4$ of the propodus. Tooth on the merus as in the type.

Merus of the 4th pair 1,05 mm. long, 0,26 mm. broad in the middle, proportion 4; carpus long 0,64 mm., 0,21 mm. thick at the distal extremity, proportion 3; propodus 1,22 mm. long, 0,17 mm. broad in the middle, proportion 7,2, with 7 or 8 spinules along the posterior margin besides the two at the distal extremity; dactylus 0,34 mm. long, a little more

than $^1/_4$ of the propodus, 0,1 mm. broad at base. Relative measurements: merus 1,64, carpus 1, propodus 1,9; propodus 1,16-times longer than the merus, tooth of the merus as in the type.

Merus of the 5th pair 0,92 mm. long, 0,232 mm. broad in the middle, proportion 4; carpus 0,62 mm. long, 0,186 mm. thick at the distal extremity, proportion 3,3; propodus 1,2 mm., 0,15 mm. broad in the middle, proportion 8. Dactylus 0,34 mm. long, a little more than $^1/_4$ of the propodus, 0,09 mm. broad at base. Relative measurements: merus 1,5, carpus 1, propodus 2. Propodus 1,3-times as long as the merus.

Of the female only the leg of the 3rd pair could be measured. Merus 1,2 mm. long, 0,28 mm. broad in the middle, proportion 4,3; carpus 0,68 mm. long, 0,22 mm. thick at the distal extremity, proportion 3,1; propodus 1,2 mm. long, 0,18 mm. wide in the middle, proportion 6,6, propodus with 11 or 12 spinules besides the two at the distal extremity. Dactylus 0,33 mm. long, a little more than $^1/_4$ of the propodus, 0,1 mm. broad at base. Relative measurements: merus 1,8, carpus 1, propodus 1,8. Merus and propodus of equal length.

These measurements show also that in the peraeopods of the 3rd and 4th pair the merus appears a little shorter in proportion to the carpus than in the type. The 2nd pleopod of the male shows the following measurements. Exopodite 0,62 mm. long, 3-times as long as broad; endopodite of the same length but a little less broad, appendix interna 0,22 mm. long, 5-times as long as thick, with distinct cincinnuli; appendix masculina a little shorter, furnished with 6 or 7 long setae on the tip and 6-times as long as thick.

Ova 0,52 mm. long, a little less broad.

General distribution: Off Siau-island (DE MAN), off the coast of Obi Major (DE MAN).

17. *Alpheopsis* sp. Pl. III, Fig. 12—12*c*.

Stat. 166. August 22. 2° 28′.5 S. 131° 3′.3 S. Midway between Ceram and New Guinea. 118 m. Bottom hard, coarse sand. 1 specimen.

This specimen, which is no doubt still very young, should probably be referred to *Alpheopsis trispinosa* (Stimps.), but I hesitate to do so, because it does not fully agree with the figures of this species published by Professor COUTIÈRE in his great work "Les Alpheidae" (Annal. des Scienc. Nat. 8e Série. Zool. T. IX, 1899) — though these differences may once prove to be owing to its young age. *Alpheopsis trispinosa* (Stimps.) occurs in Port Jackson, but should, according to COUTIÈRE, be also found on the west coast of Africa!

This specimen is only 8,2 mm. long from the apex of the rostrum to tip of telson, the carapace being 2,4 mm. long, the abdomen 5,8 mm. The slender acuminate rostrum (Fig. 12) reaches to the distal extremity of basal antennular article and is 0,33 mm. long, i. e. one-sixth the rest of the carapace. Extra-corneal spine also acute, half as long as the rostrum, with the tips slightly curved inward. The lateral margins of the rostrum pass with a regular curve into the anterior margin of the carapace, and one observes hardly a trace of an angle between the inner margin of the extra-corneal spines and the anterior border of the carapace. In COUTIÈRE's figure 26 at p. 74 of the quoted work the three spines of the anterior border of the carapace show a different stouter shape and they make distinct angles with that border. In a lateral

view of the carapace the upper border of the cardiac region appears a little concave, that of the gastric slightly convex, and the upper margin of the rostrum runs obliquely downward, while the tip projects horizontally forward.

The eyes do not project beyond the anterior margin of the carapace, the corneae are half as broad as long. The antennular peduncle measures about one-third the length of the carapace, the 2nd joint is as long as the visible part of the 1st and a little longer than the 3rd; the anterior border both of the 1st and of the 2nd article is fringed with long feathered setae. The stylocerite, acuminate and with the apex slightly turned outward, extends a little beyond the basal article; the flagella do not seem to agree with COUTIÈRE's figure 120 (l. c. p. 133).

Basicerite with a small spine on the anterior border of the lower surface, antennal peduncle reaching to the distal extremity of the 2nd joint of the antennular stalk; according to STIMPSON the basicerite should be unarmed. The rounded tip of the lamella of the scaphocerite reaches a little beyond the distal extremity of 2nd antennular article, the terminal spine, that projects rather far beyond the lamella, extends almost to the tip of the antennular peduncle, the outer margin, finally, is slightly concave.

Telson 0,98 mm. long, 10-times as long as the distance between the postero-lateral angles, while the width at the base, 0,46 mm., is almost half the length; of the two spines at the postero-lateral angles the longer inner one is as long as the distance between these angles, the outer almost half as long as the inner. The anterior pair of dorso-lateral spinules are implanted just on the middle of the telson, the posterior pair a little farther distant from the posterior margin than from the anterior pair, these spinules are 0,085 mm. long. The posterior margin of the telson agrees with the figure 396 in COUTIÈRE's work (l. c. p. 314).

The outer uropod reaches as far backward as the longer terminal spines of the telson, the inner is but a trifle shorter.

The nearly straight lower border of the pleura of the 5th somite terminates in a small acute tooth, while the tooth at the end of the lower border of the 6th is much larger.

External maxillipeds a little longer than the carpocerite, reaching the middle of 3rd antennular article, terminal joint $2^1/_2$-times as long as the penultimate. The two peraeopods of the 1st pair (Fig. 12*a*) are equal, in one of them the fingers are a trifle shorter than in the other, but the difference is very small; STIMPSON describes them as "fere aequales", while according to COUTIÈRE's figures they should be rather very unequal. Merus obtuse at the distal extremity, nowhere acute. Carpus very short, the anterior surface widened, concave. Chelae 2,5 mm. long, nearly as long as the carapace, rostrum included, 4-times as long as the height of the palm. According to COUTIÈRE's figure 228 (l. c. p. 193) the compressed fingers should in *Alpheopsis trispinosa* be one-fourth shorter than the palm, according to the figure 230, however, one-third. In the specimen from Stat. 166 the fingers are hardly half as long as the palm, in one chela the fingers are 0,8 mm. and the palm 1,7 mm. long, in the other 0,76 mm. and 1,7 mm., so that they are shorter than in COUTIÈRE's species. The T-shaped groove on the palm agrees with the description and the figures of the french author, the longitudinal groove extends to the proximal third of the palm, the notch near the articulation of the fingers appears, however, on the outer side hardly deeper than on the inner and the

"lobe alphéopsidien" on the outer side is well-developed, but appears more rounded than in the figure 228. The immobile finger is triangular and bears on the proximal half of the cutting-edge (Fig. 12*b*) two small, little prominent teeth, of which the first, near the articulation, is a little smaller than the other, while one observes on the middle of the fingers still the trace of a third tooth. The dactylus appears in the middle one-third higher than the immobile finger, but at their base the latter appears one-third higher than the dactylus; the dactylus presents only one small, rounded tooth that fits between the two of the immobile finger. The upper margin of the dactylus is regularly curved and provided with setae except near the base, short setulae occur also near the cutting-edges of both fingers and a few setae are found on the merus and the ischium.

Of the following peraeopods only those of the 3rd pair (Fig. 12*c*) are preserved, they agree with COUTIÈRE's figure 315 (l. c. p. 259). Ischium armed with 2 small spines; merus 0,92 mm. long, 0,132 mm. broad in the middle, 7-times as long as broad; carpus 0,6 mm. long, two-thirds of the merus, slightly thickened at the distal extremity, the width being here almost $^1/_5$ the length; propodus long 1,04 mm., a little longer than the merus, 0,09 mm. broad in the middle, almost 12-times as long as wide and provided with 5 short spinules on the lower margin, and with 2 longer ones at the distal extremity; dactylus 0,39 mm. long, a little more than one-third of the propodus, 0,05 mm. wide at the base, slender, tapering, slightly curved. Except the dactylus this leg is furnished with a few setae.

18. *Synalpheus amboinae* (Zehntner). Pl. III, Fig. 13, 13*a*.

Synalpheus amboinae (Zehntner) J. G. de Man, Siboga Exp., Monogr. XXXIX*a*[1], Part II, Family Alpheidae, 1911 (text) p. 203, 1915 (plates) Pl. VI, fig. 20, 20*a*.

Stat. 89. June 21. Pulu Kaniungan Ketjil. Reef. 1 egg-bearing female.
Krakatau, 2 females without eggs, collected by Prof. SLUITER.
1 very young specimen, collected August 1908 by Dr. VAN DER SANDE on a coralreef near the northcoast of Flores at 8° 20′ 28″ S., 121° 36′ 17″ E.

The egg-bearing female from Stat. 89 is 25 mm. long. The rostrum reaches just beyond basal antennular article, the lateral spines extend to the middle of the visible part of it. This specimen has lost the large cheliped, but bears still the smaller. Chela 5,2 mm. long, palm 3 mm., fingers 2,2 mm., palm almost one and a half as long as the fingers; the palm, 1,1 mm. high in the plane of the fingers, appears almost 3-times as long as high. Ova numerous, small, 0,6 mm. long.

The two females from Krakatau are 21 mm. and 17 mm. long. The latter bears still the small cheliped, which resembles that of the female from Stat. 89. The large chela of the larger specimen (Fig. 13, 13*a*) is 11 mm. long, palm 7 mm., fingers 4 mm.; the palm, 3 mm. high in the plane of the fingers, appears a little more than twice as long as high; of the large chela of the other female the palm is 6 mm. long, the fingers 3 mm., and the palm 2,5 mm. high. These numbers show that in not yet full-grown specimens the fingers are longer in proportion to the palm than in the adult, for, according to ZEHNTNER, in full-grown specimens which are 26 mm. long, the fingers measure hardly one-third the length of the palm (in the figure 23

of ZEHNTNER's paper, however, in: Revue Suisse de Zoologie, T. II, 1894, Pl. VIII, the fingers are distinctly longer than one-third of the palm). The dactylus which in these half-grown specimens appears less high than in the adult, according to ZEHNTNER's figure, is armed at the base with a very strong, obtuse tooth, that fits into a deep concavity of the immobile finger; both the outer and the inner border of this concavity are armed with two small teeth; at the outer side these two teeth are of equal size and obtuse, at the inner side the distal tooth is also obtuse but larger than those of the outer side and twice as large as the proximal tooth, which is subacute, and between the latter and the articulation one observes a third tooth, which is very sharp, almost spiniform and nearly of the same size as the distal tooth. In ZEHNTNER's figure these teeth are not visible, perhaps they are worn off in adult specimens. The upper border of the palm is a little prominent at the inner side of the distal extremity, though obtuse, but in a lateral view this prominence looks like a small tooth.

The young specimen from Flores, finally, is only 11 mm. long and belongs perhaps to the same species. The rostrum reaches just beyond the 2nd antennular article, while the lateral spines almost extend to the far end of the 1st article. The telson is comparatively longer in proportion to the width than in the other specimens, but the fingers measure about $^1/_3$ of the palm!

Measurements of the telson.

	N° 1	N° 2	N° 3	N° 4
Proportion between the length of the telson and the width of the posterior margin	3,1	3,5	3,3	4,8
Proportion between the greatest width and that of the posterior margin	2,2	2,42	2,24	2,4
Length of the dorso-lateral spinules	0,45 mm.	0,35 mm.	0,35 mm.	0,16 mm.

N° 1 female from Stat. 89; N° 2 and 3 females from Krakatau; N° 4 young specimen from the northcoast of Flores.

19. *Synalpheus jedanensis* de Man.

Synalpheus jedanensis J. G. de Man, Siboga Exp., Monogr. XXXIX*a*[1], Part II, Family Alpheidae, 1911 (text) p. 222, 1915 (plates) Pl. VII, fig. 27—27*c*.

Stat. 273. December 23/26. Anchorage off Pulu Jedan, East coast of Aru-islands. (Pearl-banks). 13 m. Bottom sand and shells. 3 young specimens.

One of the specimens is 6,5 mm. long from tip of rostrum to tip of telson. The rostrum reaches to the distal extremity of basal antennular article, the lateral spines are a little shorter. The antennular peduncle has a stouter shape than in fig. 27 (l. c.), the 2nd joint appears about as long as wide, not longer than wide, and of the same size as the 3rd. The proportion between the length (0,95 mm.) of the telson and the distance between the postero-lateral angles is 3,15, the telson appearing comparatively a little longer in proportion to the width of the posterior margin than in full-grown specimens; the proportion between the greatest width anteriorly and the width of the posterior margin is 2,27; the proportion between the length of the telson and the distance of the anterior pair of dorso-lateral spinules, that are 0,1 mm. long, from the

posterior margin is 1,98 and the proportion between the length of the telson and the distance of the posterior pair of spinules from the posterior margin 1,6. In this specimen the anterior pair of spinules are situated just in the middle of the telson, in another specimen nearly of the same size just before the middle.

The relative measurements of the 3rd peraeopod of the specimen long 6,5 mm. are: merus 2,7, carpus 1, propodus 2,45. The merus which is armed on the distal half of the posterior margin with 4 spinules, is 3,6-times as long as wide, the carpus 1,9-times as long as thick, the propodus with 6 spinules on the posterior margin 5-times as long as wide. The dactylus measures one-third of the propodus, is 2,6-times as long as wide at the base and the dorsal claw is half as long as the ventral or principal one.

20. *Synalpheus paraneomeris* Cout. var. *praedabunda* de Man.

Synalpheus paraneomeris Cout. var. *praedabundus* J. G. de Man, Siboga Exp., Monogr. XXXIX*a*[1], Part II, Family Alpheidae, 1911 (text) p. 240, 1915 (plates) Pl. VIII, fig. 34—34*c*.

Stat. 240. November 22. Banda Anchorage. Reef. 1 egg-bearing female.

The rostrum reaches a little beyond the middle of the visible part of 1st antennular article and, when measured from the frontal margin, proves to be 2,8-times as long as wide at base; lateral teeth half as long as the rostrum, broadly triangular, with the acute tips a little turned inwards.

Antennular peduncle four times as long as the 2nd article is wide; 2nd and 3rd joint together nearly one and a half as long as the visible part of the 1st; 2nd joint a little longer than broad distally. Stylocerite reaching to the middle of 2nd joint.

Upper angle of basicerite obtuse, little prominent, lower spine as long as the stylocerite, not shorter; carpocerite 3,54-times as long as wide in the middle, terminal spine of scaphocerite as long as carpocerite, not shorter.

Unfortunately the telson is wanting.

Peraeopods of the 1st pair, of which the larger occurs on the left side, like in the specimens from Stat. 129, described in 1911. Large chela 4 mm. long, fingers 1,12 mm. long, about one-fourth the length of the chela and a little more than one-third of the palm; palm 1,52 mm. high in the plane of the fingers, a little more than one-third the length of the chela, so that the palm appears almost twice as long as high. Smaller chela 1,85 mm. long, proportion between the length of both chelae 2,16; fingers as long as the height of the palm in their plane, viz. 0,66 mm., the length of the chela being 2,8-times as long as the fingers and as the palm is high.

Merus of 2nd legs 5,12-times as long as wide in the middle; carpal segments long 1 mm., 0,2 mm., 0,2 mm., 0,18 mm. and 0,44 mm., 1st segment 4,54-times as long as thick at the distal extremity; chela 0,85 mm. long, almost twice as long as the 5th segment, fingers hardly longer than the palm.

Relative dimensions of the 3rd leg: merus 2, carpus 1, propodus 1,66; dactylus 0,46 (measured from the proximal extremity of the anterior margin to the tip of the ventral hook).

Merus 3,4-times as long as wide, carpus 2,9-times as long as thick at the distal extremity that bears a movable spinule; propodus 5,3-times as long as wide, the lower margin with 6 spinules, long 0,12 mm., besides the two at the far end; dactylus a little more than $^1/_4$ of the propodus and 3-times as long as broad at base, agreeing with the figure 35 *c* (l. c.), but the dorsal hook almost one and a half as long as the other.

Relative dimensions of the 4th leg: merus 1,76, carpus 1, propodus 1,65; dactylus 0,47 (measured from the proximal end of the anterior margin to the apex of the ventral hook). Merus 3,4-times as long as wide, carpus 3-times as long as thick at the distal extremity, that bears a movable spinule, propodus 5,1-times as long as wide, with 5 spinules besides the two at the far end; dactylus a little more than $^1/_4$ of the propodus and 2,85-times as long as wide at base, resembling that of the 3rd pair.

Ova 0,7—0,8 mm. long.

21. *Synalpheus hastilicrassus* Cout. var. *acanthitelsoniformis* de Man. Pl. III, fig. 14, 14 *a*.

Synalpheus hastilicrassus H. Coutière, Alpheidae Mald. and Laccad. Archip., 1905, p. 875, Pl. LXXII, fig. 12—12 *d*.

Synalpheus hastilicrassus J. G. de Man, Siboga Exp., Monogr. XXXIX *a*[1], Part II, Family Alpheidae, 1911 (text) p. 263, 1915 (plates) Pl. X, fig. 45—45 *d*.

Synalpheus hastilicrassus H. Cout., var. *acanthitelsoniformis* J. G. de Man, in: Zoolog. Meded. uitgeg. vanwege 's Rijks Mus. v. Nat. Hist. te Leiden, 1920, Dl. V, Afl. 3, p. 108.

Stat. 115. July 9/11. East side of Pajunga Island, Kwandang-bay. Reef. 1 male.

Professor COUTIÈRE in his valuable dissertation of 1899, entitled Les "Alpheidae", remarks p. 296, that in the genus *Synalpheus* the 2nd pleopods show no sexual difference and that in some species the 2nd pleopod of the male bears even no stylamblys, so e. g. in *Syn. neptunus* (at least some specimens), in *Syn. biunguiculatus* etc., while in the female of the same species a single, though well-developed stylamblys occurs. After having examined the 2nd and the 3rd pleopod of the specimen from Kwandang-bay under the microscope, the endopodite of both pleopods proved to be d e v o i d of a stylamblys and the endopodite of the 2nd proved to bear no appendix masculina: we may therefore conclude by analogy that the specimen from Stat. 115 is a m a l e.

The rostrum is long, slender, acute, $4^3/_8$-times as long as broad at the level of the orbital margin, reaching almost to the middle of 2nd antennular article; lateral spines half as long as the rostrum, elongate-triangular, slender, with the acute tips slightly turned inward, the tips bearing a forwardly directed seta.

Antennular peduncle 4-times as long as the 2nd joint is wide distally; basal joint as long as the 2nd and 3rd taken together, 2nd joint a little longer than wide, 3rd a little shorter than 2nd; stylocerite as long as basal article. Basicerite t r u n c a t e above, s t r a i g h t; lower spine of basicerite a little longer than the outer margin of the basal part and a trifle longer or as long as the stylocerite. Carpocerite 3-times as long as wide in the middle, distinctly narrowing to the distal extremity, projecting beyond the antennular peduncle by a little more than the 3rd article; terminal spine of scaphocerite a little shorter than the carpocerite, but much longer than the antennular peduncle; scale of scaphocerite reaching to the middle of 3rd article.

Proportion between the length of the telson and the width of the posterior margin 2,1, proportion between the greatest width and that of the posterior margin 1,86; the dorso-lateral spinules of the anterior pair are 0,2 mm. long and the proportion between the length of the telson and the distance of these spinules from the posterior margin is 1,58; the spinules of the posterior pair are 0,23 mm. long and the proportion between the distances of both pairs from the posterior margin is 1,81. According to the original description the spiniform postero-lateral angles should not extend as far backward as the arcuate posterior margin of the telson between them, in the present specimen, however, they project (Fig. 14) by half their length beyond the posterior margin, exactly as in *Syn. acanthitelsonis* Cout.; the longer terminal spinules, long 0,38 mm., measure about two-thirds the distance between the postero-lateral angles and project by three-fourths of their length beyond the posterior margin, being longer and extending farther backward than in the typical *hastilicrassus*; the outer spinules extend by half their length beyond the postero-lateral angles.

The larger cheliped is wanting. Merus of the smaller cheliped 3,1-times as long as broad, distal extremity of upper border truncate, unarmed. Relative dimensions of the small chela: fingers 1, total length 2,5, height 0,8. The fingers are a little longer than the height of the palm and the chela is 3-times as long as high. Merus of 2nd legs 5,4-times as long as wide. First segment of the carpus 4-times as long as thick at the distal extremity, a trifle longer than the sum of the four following, 2nd segment a trifle longer than the 3rd, that is as long as the 4th; chela nearly as long as the sum of the 2nd to 5th segment, fingers about one and a half as long as the palm.

Relative dimensions of the 3rd leg: merus 2,75, carpus 1, propodus 2,13, dactylus 0,4 (measured from the proximal end of the anterior margin to the tip of the ventral hook). Merus 4,3-times as long as wide, carpus 2,4-times as long as thick at the distal extremity, propodus 5,8-times as long as wide, dactylus 3-times as long as broad at base; propodus with 9 spinules, long 0,07—0,09 mm., besides the two at the distal extremity. Merus 1,29-times as long as the propodus.

Length about 10 mm.

This specimen much agrees in its dimensions with the female from the same Station, described in 1911.

Though the differences from the typical species presented by the telson are no doubt individual, they are important enough for creating a proper name *acanthitelsoniformis* for this variety.

22. *Synalpheus* sp. Pl. III, fig. 15—15*c*.

Stat. 144. August 7/9. Anchorage north of Salomakiëe-(Damar-)island. 45 m. Coral bottom and Lithothamnion. 1 egg-bearing female.

I do not succeed in identifying with certainty this specimen. The nearest related species are *Syn. biunguiculatus* (Stimpson) Cout. (H. Coutière, Alpheidae Mald. and Laccad. Archip. 1905, p. 873, Pl. LXXI, fig. 8—8*d*), *Syn. pachymeris* Cout. (H. Coutière, ibidem, p. 873, Pl. LXXI, fig. 9—9*a'*) and the species which was referred by me to *Syn. biunguiculatus* (Stimps.)

in: J. G. DE MAN, Siboga Exp., Monogr. XXXIX*a*[1], Part II, Family Alpheidae, 1911 (text), p. 273, 1915 (plates) Pl. XI, fig. 51—51*d*, but which no doubt is a different form. The differences presented by the female from Stat. 144 are, however, slight and trifling, this specimen may perhaps prove to belong either to *Syn. pachymeris* Cout. or to the *Syn. biunguiculatus* of the "Siboga Alpheidae" and I therefore hesitate to describe it as new, because the variability of some characters is still unknown in these species.

Rostrum (Fig. 15) rather obtuse, 3-times as long as wide in the middle, reaching not yet to the middle of the visible part of basal antennular article; lateral spines as in *Syn. biunguiculatus* (Stimps.) Cout. (H. COUTIÈRE, l. c. fig. 8), triangular, rather obtuse, only a trifle shorter than the rostrum, less broad than in *Syn. pachymeris* (H. COUTIÈRE l. c. fig. 9).

Antennular peduncle $4^1/_3$-times as long as the 2nd article is wide distally; visible part of basal article one and a half as long as 2nd, 2nd one-third longer than wide distally, 3rd article as long as 2nd, not shorter. Upper spine of basicerite well developed, as long as the rostrum, lower spine a little longer than the basicerite itself and than the stylocerite that just reaches beyond the distal extremity of basal article. Carpocerite 5-times as long as broad, projecting beyond the antennular peduncle by two-thirds of the 3rd article; terminal spine of scaphocerite a little shorter than the antennular peduncle, lamella reaching to the far end of 2nd article, outer margin of scaphocerite slightly concave.

The telson (Fig. 15*a*) fully resembles that of the male from Stat. 282 (J. G. DE MAN, l. c. fig. 51), it is 3-times as long as the posterior margin is wide and the proportion between the width at the base and that of the posterior margin is 2,26; the dorso-lateral spinules are rather large, those of the anterior pair are 0,18 mm. long, those of the posterior 0,2 mm.; proportion between the length of the telson and the distance of the anterior pair from the posterior margin 1,46, proportion between the distances of both pairs from the posterior margin 1,55. The postero-lateral angles are acute, though very short; the posterior margin appears convex, though not so much as in COUTIÈRE's figure 8*d*: when the postero-lateral angles are united by a transverse line, the length of this line, i. e. the width of the posterior margin, is in proportion to the length, in the middle line, of the convex part posterior to this line, like 23 : 4, in the figure 8*d*, however, like 23 : 6.

Large cheliped on the left side. Merus twice as long as broad, with an acute tooth at the distal extremity of the upper margin. Relative dimensions of the large chela: fingers 1, total length 3,53, height 1,17. The larger chela is just 3-times as long as high in the plane of the fingers, which are rather short, measuring little more than one-fourth the total length, and the dactylus is strongly curved; the slightly convex upper border of the palm ends distally, at the supero-internal angle, in a rather small obtuse tooth, that is directed straight forward. The large chela is 2,65-times as long as the smaller, of which the relative dimensions are: fingers 1, total length 2,66, height 0,82; this chela appears also about 3-times as long as high and the fingers measure three-fifths of the palm. The merus of the small cheliped is 2,8 or 2,9-times as long as broad and the upper border is unarmed at the distal extremity.

Merus of 2nd legs 4,7-times as long as wide in the middle. First carpal segment $3^1/_3$-times as long as thick at the far end, the sum of the four following segments is 1,28-times as long

as the 1st, which is only a trifle shorter than the chela. The relative measurements of the legs of the 3rd pair (Fig. 15*b*) are the following: merus 2,37, carpus 1, propodus 1,45, dactylus 0,25 (measured from the proximal extremity of the anterior margin to the tip of the ventral hook). Merus 3,33-times as long as wide, carpus 2,8-times as long as thick at distal extremity, propodus 4,4-times as long as broad, lower margin with 7 short spinules, long 0,07—0,08 mm., besides the two at the far end, dactylus 1,9-times as long as broad at base; the ventral hook is placed perpendicular (Fig. 15*c*) to the posterior margin of the dactylus and appears twice as long as broad at its base, the dorsal hook is almost one and a half as long as the other and appears at its base also broader than the ventral hook, while the notch between both is concave. Merus 1,64-times as long as the propodus.

Ova 0,7 mm. long. Entire length about 11 mm.

Syn. biunguiculatus (Stimps.) Cout. of Djibouti and of the Maldive Archipelago is very closely related, but apparently differs from the described female not only by the posterior margin of the telson being a little more prominent, but especially by the much smaller size of the dorso-lateral spinules: according to COUTIÈRE's figure 8*d* the distance between the implantation of the anterior pair and the posterior margin appears ten times, but in the female from Stat. 144 only five times as long as the spinules. The measurements of the 3rd legs nearly agree, but the propodus appears a little less slender than in COUTIÈRE's figure 8*c*: the proportion between the length and the width of the propodus in COUTIÈRE's species was erroneously indicated by me (l. c. 1911 (text) p. 275, Table B, N° 5) as being four times, it is indeed five times.

Syn. pachymeris Cout. apparently differs by the shape of the lateral frontal teeth that are broader and more obtuse, by the 3rd antennular article being distinctly shorter than the 2nd, by the lamella of the scaphocerite being shorter than the latter and by the absence of the 3 to 6 movable spinules, with which the lower margin of the merus of the 3rd legs is armed, though, according to COUTIÈRE, these spinules are sometimes wanting in this species owing either to their fragility or because they should be not developed at all.

As regards, finally, the species from the Indian Archipelago which was referred by me (l. c. p. 273) to *Syn. biunguiculatus*, it seems to me very probable that it is identical with the species from Stat. 144, the telson presenting exactly the same form and characters, but the 3rd antennular article is described as one-fourth shorter than the 2nd and the rostrum as reaching to the middle of the visible part of basal antennular article and as being a little more slender. In Table A, p. 274, the proportion between the length of the telson and the width of the posterior margin of N° 2 is not 3,3, but 3,17.

23. *Alpheus Haïlstonei* Cout. var. *laetabilis* de Man.

Alpheus Hailstonei Cout. var. *laetabilis* J. G. de Man, Siboga Exp., Monogr. XXXIX*a*[1], Part II, Family Alpheidae, 1911 (text) p. 333, 1915 (plates). Pl. XIV, fig. 64*d*, 64*e*.

Stat. 99. June 28/29/30, 6° 7'.5 N., 120° 26' E. Anchorage off North-Ubian. 16—23 m. Lithothamnion-bottom. 1 female without eggs.

Stat. 144. August 7/9. Anchorage north of Salomakiëe-(Damar)-island. 45 m. Coral bottom and Lithothamnion. 2 females without eggs.

The female from Stat. 99 is 11 mm. long, the other 12 mm., the ova-bearing specimens, however, attain the length of 15 mm. As regards the rostrum, the orbital spines, the antennular and antennal peduncles and the scaphocerite, these specimens resemble the typical form (H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, Pl. LXXIV, fig. 18). The female from Stat. 99 has still the small cheliped. Merus 1,75 mm. long, measured along the upper border, which is unarmed at the distal end, 0,37 mm. broad in the middle, proportion 4,9; there is a small spiniform seta at the distal end of the upper border of the ischium and a somewhat longer spine occurs at the distal end of the lower border of this joint; infero-internal margin of the merus with 4 small movable spinules, alternating with setae, and with an acute tooth at the distal extremity. Chela 2,45 mm. long (palm 1,4 mm., fingers 1,05 mm.), palm 0,46 mm. high, the palm being 3-times as long as high (according to COUTIÈRE in the typical form 2,7-times); the upper border of the palm is slightly emarginate, just behind the articulation of the dactylus, and ends distally in a tooth. Four or five long hairs are implanted on the upper border of the palm, similar long hairs though also shorter ones occur on the fingers.

In one female from Stat. 144 the carpal segments of the right 2nd leg are 1,18 mm., 0,6 mm., 0,38 mm., 0,56 mm. and 0,64 mm. long, chela 0,86 mm. (palm 0,36 mm., fingers 0,5 mm.); the fourth segment appears still a little shorter than the 2nd. The left leg is wanting and the other female has lost them also.

In the female from Stat. 99 the relative measurements of the 3rd legs are: merus 1,58, carpus 1, propodus 1,44; merus 6,6-times as long as broad, carpus 5,5-times as long as thick distally, propodus 9-times as long as broad, furnished with 8 spinules, each of which is accompanied by a smaller one. The dactylus, which is 5,6-times as long as broad at its base, measures almost one-third the length of the propodus, the latter being 1,44 mm. long, the dactylus 0,45 mm.

In the female from Stat. 144 the relative measurements of the 3rd pair are exactly the same as in the female from Stat. 99, the merus, however, is 7,1-times as long as broad, the carpus 5,6-times, the propodus 9,4-times, but the propodus bears also 8 pairs of spinules; dactylus 5-times as long as broad, appearing as long in proportion to the propodus as in the other female.

24. *Alpheus Hailstonei* Cout. var.

Stat. 144. August 7/9. Anchorage north of Salomakiëe-(Damar)-island. 45 m. Coral bottom and Lithothamnion. 1 ova-bearing female.

This specimen, long 14 mm., fully agrees, as regards the relative measurements of the 2nd and 3rd legs with the variety *laetabilis*, but differs from it by the dactyli of the three posterior legs presenting no trace of an accessory claw on their posterior margin! This female forms therefore a transition to the typical species and to the variety *assimulans*.

The rostrum extends until the distal third of the visible part of basal antennular article, the orbital spines that reach a little beyond the middle of the rostrum, are slightly turned inward. Second antennular article a little more than twice as long as thick, 0,8 mm. long,

0,35 mm. thick, and a trifle longer than the visible part, long 0,75 mm., of basal article; 3rd article 0,5 mm. long, $^5/_8$ of 2nd. Stylocerite as long as basal article. Antennal peduncle as long as that of the upper antennae, terminal spine of the scaphocerite reaching almost to the tip of the antennular peduncle.

The peraeopods of the 1st pair are wanting. Of the right leg of the 2nd pair the merus is 9,5-times, of the left 9-times as long as wide. The carpal segments of the right leg are 1 mm., 0,48 mm., 0,36 mm., 0,34 mm. and 0,62 mm. long, the chela 1 mm. long (palm 0,42 mm., fingers 0,58 mm.); of the left leg the segments are 1 mm., 0,6 mm., 0,4 mm., 0,36 mm. and 0,6 mm. long, the chela 0,97 mm. (palm 0,44 mm., fingers 0,53 mm.). These numbers show that, like in the variety *laetabilis*, the fourth segment is distinctly shorter than the 2nd.

The relative measurements of the 3rd pair are: merus 1,4, carpus 1, propodus 1,3, so that both the merus and the propodus are a little shorter in proportion to the carpus than in the other female from this Station, referred to the variety *laetabilis*. The merus is 7,2-times as long as broad, the carpus 7-times as long as thick, the propodus 11-times as long as broad and provided with 8 pairs of spinules. The dactylus measures one-third of the propodus and is 6,2-times as long as broad at base.

This specimen is probably an individual variety of the *laetabilis*-form; when, however, it should prove to be constant, a proper name must be created.

25. *Alpheus paradentipes* Cout.

Alpheus paradentipes H. Coutière, Alpheidae Mald. and Laccad. Archip. 1905, p. 880, Pl. LXXIV, fig. 17.
Alpheus paradentipes J. G. de Man, Siboga Exp., Monogr. XXXIX *a*[1], Part II, Family Alpheidae, 1911 (text), p. 336.

Stat. 220. November 1/3. Anchorage off Pasir Pandjang, west coast of Binongka. 54 m. Bottom coral sand. 1 male.

This specimen is 7,85 mm. long from tip of rostrum to tip of telson (carapace 2,65 mm., abdomen 5,2 mm.), the abdomen being only about twice as long as the carapace. Rostrum and orbital spines like in the specimen from Stat. 279, described in 1911. Second antennular article twice as long as thick, just as long as the visible part of the 1st; 3rd article a little more than two-thirds of 2nd. Antennal peduncle and terminal spine of scaphocerite almost reaching to the tip of the antennular peduncle.

Large cheliped lost. Merus of the small (left) cheliped 3,5-times as long as broad in the middle, when measured along the upper border of the outer surface, that ends in an acute tooth; infero-internal margin with 6 or 7 small spinules along its whole length. Chela 1,9 mm. long, one-fourth the length of the body, fingers as long as the palm.

Carpal segments of the right leg of the 2nd pair 0,5 mm., 0,36 mm., 0,18 mm., 0,2 mm. and 0,28 mm.; chela 0,66 mm. (palm 0,28 mm., fingers 0,38 mm.). Merus of this leg 1,15 mm. long, broad in the middle 0,14 mm., 8-times as long as broad.

Relative measurements of the 3rd leg: merus 1,85, carpus 1, propodus 1,4. Merus

6,5-times as long as broad in the middle, carpus 4,7-times as long as thick at the distal extremity, propodus 7-times as long as broad in the middle. The three movable spinules on the posterior margin of the carpus are present, but that of the distal extremity is lost. Propodus with 8 pairs of spinules, dactylus one-third of the propodus, 5-times as long as broad, ventral claw little shorter than the other.

The two appendices are implanted on the middle of the inner branch of the 2nd pleopod; appendix masculina one-fourth longer than the stylamblys and tipped with 6 long setae, that are nearly as long as the appendix itself, stylamblys with 4 well-developed cincinnuli.

This rare species, discovered in the Maldive Archipelago, is also known from Rumah-kuda-bay, Roma-island.

26. *Alpheus acuto-femoratus* Dana.

Alpheus acuto-femoratus Dana, J. G. DE MAN, Siboga Exp., Monogr. XXXIX*a*[1], Part II, Family Alpheidae, 1911 (text), p. 337.

Stat. 115. July 9/11. East side of Pajunga Island, Kwandang-bay. Reef. 1 young female without eggs.

This specimen, which after the examination of the 2nd pleopod proved to be a female, is 11,5 mm. long from apex of rostrum to tip of telson and has lost the large cheliped. The rostrum, almost twice as long as broad at its base, extends to the distal third of the visible part of basal antennular article. Antennular peduncle, carpocerite and scaphocerite fully agree with the figure 63 on Plate XXVII of my work of 1902 (Abhandl. d. Senckenb. naturf. Gesells. Bd. XXV). Basicerite with a small spine. Telson 1,48 mm. long, 1 mm. broad anteriorly, while the distance between the postero-lateral angles is 0,45 mm.; distance between the anterior pair of dorso-lateral spinules and the posterior margin 0,9 mm., distance between the posterior pair and that margin 0,48 mm. Outer surface of merus of small cheliped twice as long as broad, inner margin with a well-developed acute tooth. The acute tooth on the anterior margin of the carpus is placed at the supero-internal angle; viewed from above the carpus appears one-third longer than broad anteriorly. The small chela is 3,1 mm. long, palm 1,9 mm., fingers 1,2 mm. and the palm is 1 mm. high, measured on the outer side; according to my description of 1902 in the ova-bearing female, long 19 mm., of this species the height of the palm should be two-thirds of its length, so that the palm proves to be less high at a younger age; the anterior border of the carpus and the inner side of palm and fingers are clothed with long stiff hairs that are not feathered though scabrous, a few similar hairs occur also on the distal extremity of the upper border of the merus, shorter ones on the margins of this joint. Also in the other characters the chela agrees with the description of 1902.

The carpal segments of the 2nd pair of legs measure from the 1st or proximal one to the 5th 0,46 mm., 1,32 mm., 0,34 mm., 0,34 mm. and 0,54 mm., the 2nd segment being almost 3-times as long as the 1st; palm 0,54 mm., just as long as the 5th segment, fingers 0,42 mm.

Merus of 3rd pair 4-times as long as wide in the middle. The merus of the 4th pair, the apical tooth of which is as large as that of the 3rd, is 3,5-times as long as broad in the

middle; the relative measurements of this leg are: merus 2, carpus 1, propodus 1,1, while the dactylus measures two-fifths of the propodus. As regards the relative measurements of the antennular peduncle, the carpocerite and the scaphocerite, also as regards the peraeopods of the four posterior pairs *A. acuto-femoratus* much resembles *A. consobrinus* de Man, but when the specimen from Stat. 115 is compared with the ova-bearing female of *A. consobrinus* described below, I observe nevertheless some differences. Of *A. consobrinus* the basicerite is unarmed. In a lateral view of the carapace the interocular part of the rostrum appears in this female of *A. consobrinus* distinctly convex, curved and hardly or not concealed by the eyes, in the specimen of *A. acuto-femoratus*, however, the interocular part appears in this view situated behind the eye, running nearly straight downward. The telson shows somewhat different measurements. In the specimen of *A. acuto-femoratus* the 2nd carpal segment of the 2nd peraeopods is almost 3-times as long as the 1st, in the full-grown female of *A. consobrinus*, however, little more than twice as long (DE MAN, l. c. 1911, p. 362) and in the young female, described below, even only a little more than one and a half. The most striking differences between the two species are, however, presented by the two chelipeds.

27. *Alpheus consobrinus* de Man.

Alpheus consobrinus J. G. de Man, Siboga Exp., Monogr. XXXIX*a*[1], Part II, Family Alpheidae, 1911 (text), p. 360, 1915 (plates), Pl. XVI, fig. 75—75*l*.

Stat. 213. September 26—October 26. South-Island near Saleyer. Reef. 1 egg-bearing female.

This specimen is only 9,3 mm. long from apex of rostrum to tip of telson and fully agrees with my description. The rostrum reaches almost to the middle of the visible part of 1st antennular article, the 2nd article is hardly longer than that visible part of 1st. Basicerite unarmed. In a lateral view the rostrum runs obliquely downward, rather much, with the acute tip slightly turned upward. Telson 1,5 mm. long, anteriorly 0,76 mm. broad, distance between the postero-lateral angles 0,53 mm.

Outer surface of the merus of the larger cheliped (on the right side) twice as long as broad, acute tooth at the inner margin well-developed. Looked at from the outer (upper) side the large chela proves to be 3,2 mm. long, the palm 1,12 mm. thick, proportion 2,8; when, however, the lower (outer) side is looked at, the chela resembles Fig. 72*e* on Plate XV of my work, the palm being higher with regard to the height of the fingers than in the male (Pl. XVI, Fig. 75*c*), while the lower but especially the upper border appear more strongly curved. Merus of the small cheliped $2^1/_3$-times as long as broad, measured on the outer side; internal margin unarmed. Carpus almost twice as long as broad distally. Viewed at from the upper side (as in Fig. 75*g*) the chela proves to be 3,5-times as long as broad proximally, while the palm is in proportion to the fingers as 13 to 10, exactly as in the adult female from Stat. 315 described by me in 1911. Palm presenting only a few setae on the inner side near the upper border.

Carpal segments of the 2nd legs long 0,38 mm., 0,62 mm., 0,22 mm., 0,22 mm. and 0,36 mm., chela long 0,72 mm. (palm 0,34 mm., fingers 0,38 mm.); these numbers prove that

in the young female the 2nd joint is still but a little more than one and a half as long as the 1st.

28. *Alpheus frontalis* H. M.-Edw.

Alpheus frontalis H. M.-Edw., J. G. DE MAN, Siboga Exp., Monogr. XXXIX*a*[1], Part II, Family Alpheidae, 1911 (text) p. 369, 1915 (plates), Pl. XVII, fig. 79—79*b*.

Telok Berandang, Pulu Babi (2° 7′ N., 96° 40′ E.). 1 young male collected April 1913 by Mr. E. JACOBSON.
Sinabang, Simalur. 1 adult male and 1 adult ova-bearing female collected February 1913 by Mr. E. JACOBSON.
Telok Dalam, Nias. 1 adult ova-bearing female collected by Dr. KLEIWEG DE ZWAAN.
Stat. 133. July 25/27. Anchorage off Lirung, Salibabu-island. 1 young female.

In the young male, long 22 mm., from Pulu Babi the small cheliped is situated on the right side; the chela is 8 mm. long (palm 4,5 mm., fingers 3,5 mm.), the dactylus is 2 mm. broad and the palm 3,8 mm. high. The front resembles my figure 79, but on either side of the median emargination the frontal margin is straight, not at all concave.

The female from Sinabang is 41 mm. long, the male 38 mm. In the male the front resembles fig. 79, but on the right side the frontal margin is straight, not concave, in the female, like in the female from Nias, it agrees with the figure 79*a*, the front being more prominent, rounded, not emarginate, in the middle, with the lateral emarginations distinct; in the young specimen from Stat. 133, finally, the frontal margin is straight, without emarginations.

29. *Alpheus bidens* (Oliv.).

Alpheus bidens (Oliv.), J. G. DE MAN, Siboga Exp., Monogr. XXXIX*a*[1], Part II, Family Alpheidae, 1911 (text), p. 371, 1915 (plates), fig. 80—80*c*.

Stat. 144. August 7/9. Anchorage north of Salomakiëe-(Damar)-island. 45 m. Coral bottom and Lithothamnion. 1 young specimen, that has lost all the legs except one of the 2nd and one of the 4th pair.
Stat. 172. August 26/28. Anchorage between the island of Gisser and Ceram-Laut. Reef. 1 young specimen, that has lost all the legs excepting those of the 4th and 5th pair.

30. *Alpheus anchistus* de Man. Pl. III, fig. 16—16*c*.

Alpheus sp., J. G. DE MAN, Siboga Exp., Monogr. XXXIX*a*[1], Part. II, Family Alpheidae, 1911 (text), p. 383, 1915 (plates), Pl. XIX, fig. 85—85*b*.
Alpheus anchistus J. G. de Man, in: Zoolog. Mededeelingen, uitgeg. vanwege 's Rijks Mus. v. Nat. Hist. te Leiden, 1920. Dl. V, Afl. 3, p. 108.

Stat. 181. September 5/11. Ambon-anchorage. 54 m. Bottom mud, sand and coral. 1 male and 1 egg-bearing female.

The two specimens are of equal size, about 20 mm. long from tip of rostrum to tip of telson, a little larger than the specimen from Stat. 51, that was described by me in my work on the Siboga Alpheidae as *Alpheus* sp.: this specimen from Stat. 51, that is lying before me and that belongs to the same species as these two from Ambon, measures only

16 mm. and proved to be a male, the endopodite of the 2nd pleopod being provided with a stylamblys and an appendix masculina.

The nearest related species is no doubt *A. tenuicarpus* de Man from the north coast of Celebes and the east coast of Sumbawa. The acute rostrum which is as long as broad at base, extends horizontally forward about to the middle of the visible part of basal antennular article and is separated by very shallow concavities from the rounded orbital hoods. The rostral carina that extends only to the base of the orbital hoods, appears on its anterior half rather sharp, but posteriorly obtuse; it is rather low, quite concealed in a lateral view by the orbital hoods and appears in the middle slightly concave; separated by deep grooves from the orbital hoods, it is narrow on the anterior half but from the middle gradually widens a little before passing into the surface of the carapace, which is smooth like that of the abdomen. Of the male the telson is lost, the measurements of the telson of the female (Fig. 16) and of the male from Stat. 51 are indicated in the Table: it closely resembles that of *A. tenuicarpus*, but the dorso-lateral spinules that are 0,26 mm. long, are a little farther distant from the lateral margins. The two pairs of antennae agree with the figure 85 (l. c.) of the male from Stat. 51, but in both specimens from Ambon the antennal peduncle is as long as that of the inner antennae and in the male the antennal scale appears a little longer than the antennular peduncle.

Unfortunately the male from Ambon has lost both peraeopods of the 1st pair and the female the larger cheliped. The merus of the small cheliped (Fig. 16*a*) of the female, placed on the left side, is 5-times as long as broad in the middle, being 3,5 mm. long and 0,7 mm. broad; the distal extremity of the upper margin is unarmed, the infero-external margin finely serrulate by about 25 serrulations, while the infero-internal is armed with a small acute tooth at the distal end and with 5 aciculiform, movable spinelets that increase in length from the 1st, implanted at the proximal fourth, to the 5th placed a little beyond the middle. Between the 5th spinelet and the distal tooth the margin bears 4 or 5 long hairs and a few are implanted on the lower surface. The short carpus, 1,1 mm. long and 0,7 mm. thick distally, measures one-third of the merus and is one and a half as long as thick. Chela 5,8 mm. long, the palm which is 2,6 mm. long and 3,25-times as long as wide, is a little shorter than the fingers, the proportion between their length being like 13 : 16.

The carpal segments of the right 2nd leg of the male (the left is lost) are 1,25 mm., 1,48 mm., 0,54 mm., 0,54 mm. and 0,62 mm. long, the 2nd segment, 0,2 mm. thick, is 7,4-times as long as thick; chela 1,02 mm. long, palm 0,44 mm., fingers 0,58 mm. In the female the carpal segments of the right leg are 1,1 mm., 1,3 mm., 0,48 mm., 0,48 mm. and 0,54 mm. long, the 2nd segment 6,9-times as long as thick; chela 1 mm. long, palm 0,44 mm., fingers 0,56 mm.; for the left leg these numbers are 1,1 mm., 1,28 mm., 0,48 mm., 0,48 mm. and 0,52 mm., the 2nd segment 6,4-times as long as thick, chela 1 mm. long, palm 0,44 mm., fingers 0,56 mm.

The male bears still the peraeopods of the 3rd pair. The merus, 1,4 mm. long and 0,52 mm. broad, is 7,7-times as long as broad, the carpus, 1,8 mm. long and distally 0,45 mm. thick, is 4-times as long as thick; the propodus, that slightly narrows from the proximal to

the distal extremity, is 2,6 mm. long, 0,34 mm. broad near the base and 0,27 mm. in the middle, being almost 10-times as long as broad in the middle, the slightly curved and tapering dactylus, finally, is 1,35 mm. long. The relative measurements of the 3rd leg are therefore: merus 2,2, carpus 1, propodus 1,44, dactylus 0,75.

The 4th leg of the male presents the following measurements. Merus 3,1 mm. long, 0,42 mm. broad, 7,4-times as long as broad; carpus 1,65 mm. long, 5-times as long as thick at the distal extremity; propodus 2,4 mm. long, 0,3 mm. broad near the base, 0,24 mm. in the middle, 10-times as long as broad in the middle; dactylus lost. The relative measurements are: merus 1,9, carpus 1, propodus 1,45. The merus of the 4th leg of the female, finally, 2,7 mm. long and 0,4 mm. broad, is 6,75-times as long as broad; carpus 1,5 mm. long, 5-times as long as thick at the distal extremity; propodus 2,12 mm. long, dactylus 1,12 mm. and the relative measurements are here: merus 1,8, carpus 1, propodus 1,4, dactylus 0,75.

The appendix masculina of the 2nd pleopod of the male measures one-fourth the length of the endopodite and is implanted just behind the middle of the latter; it bears anteriorly and on the tip about a dozen of setae; the naked and glabrous stylamblys looks like a ribbon.

Alpheus tenuicarpus de Man differs at first sight by the deep emarginations, by which the orbital hoods are separated from the rostrum, by the antennal peduncle projecting by the length of 3rd article beyond that of the upper antennae, by the larger chela of the male being about 3-times as long as high and by some slight differences in the measurements of the following peraeopods.

Alpheus tenuipes de Man from the northern entrance of Buton-strait is also closely related, but easily distinguished by the different form of the telson, which is more narrowed posteriorly, with smaller dorso-lateral spinules and the posterior margin of which is truncated, not at all projecting backward; the rostral carina is separated by feeble depressions from the orbital hoods, the stylocerite is as long as basal antennular article and the peraeopods of the 3rd pair are still more slender.

Alpheus rapacida de Man, finally, differs by the rostral carina which can be followed almost to the middle of the carapace, by the less slender shape of the peraeopods and by some other characters.

Measurements in millimeters.

	N°. 1	N°. 2
Length of the telson	2,16	2,7
Width at the base	0,94	1,15
Width of the posterior margin	0,52	0,68
Length of the posterior margin in the middle line	0,18	0,28
Proportion between the length of the telson and the distance of the anterior pair of dorso-lateral spinules from the posterior margin	1,6	1,6
Proportion between the distances of both pairs of spinules from the posterior margin	1,8	1,9
Proportion between the length of the telson and the width of the posterior margin	4	4
Proportion between the width at the base and that of the posterior margin	1,8	1,7

N°. 1 male from Stat. 51, N°. 2 female from Ambon.

31. *Alpheus lepidus* de Man. Pl. IV, fig. 17.

Alpheus lepidus J. G. de Man, Siboga Exp., Monogr. XXXIX*a*[1], Part II, Family Alpheidae, 1911 (text) p. 397, 1915 (plates) Pl. XXI, fig. 92—92*f*.

Stat. 181. September 5/11. Ambon-anchorage. 54 m. Bottom mud, sand and coral. 2 egg-bearing females.

The carapace of the larger female is 4,9 mm. long, telson and 6th somite are lost; the entire length of this specimen will, however, have been about 14,6 mm., because the other specimen, in which carapace and abdomen are respectively 4,5 mm. and 8,9 mm. long, measures 13,4 mm. As regards the characters of the carapace, the antennular and antennal peduncles and the scaphocerite, these specimens fully agree with the original description. The telson of the smaller female is 1,7 mm. long, anteriorly 0,8 mm. broad, the distance between the postero-lateral angles 0,46 mm. The anterior pair of dorso-lateral spinules are implanted a little before the middle, the distance between this pair and the posterior margin being 1,06 mm., while the posterior margin is 0,6 mm. distant from the posterior pair.

Measured along the upper margin the merus of the large cheliped proves to be 2,16 mm. long, while the outer surface is 0,68 mm. broad in the middle, so that the merus is 3,2-times as long as broad; the serrulations of the infero-external margin are nearly 30 in number, the infero-internal border bears 4 spinules that slightly increase in length from the 1st or proximal one to the 4th, which is 0,09 mm. long and implanted at the anterior third; the acute tooth at the distal end of this border is small. The ischium presents also a small spinule inferiorly. The chela also agrees with the original description and the figure 92*c*; it is 4,2 mm. long, measuring $^6/_7$ of the length of the carapace, palm 2,8 mm., fingers 1,4 mm., while the palm is 1,35 mm. high. The small cheliped, placed at the right side, was still unknown (Fig. 17). Merus a little longer than that of the large cheliped, but for the rest closely resembling it; outer surface 2,5 mm. long, 0,82 mm. broad, just 3-times as long as broad, upper border unarmed, outer margin serrulate like in the other leg, inner border with 5 movable spinules, of which the distal one, at the anterior third, is 0,12 mm. long, while the preceding ones diminish in length; the inner border, that appears also somewhat serrulate, is furnished with setae and has a very small acute tooth at the distal extremity, which is only half as long as the foremost movable spinule. Carpus long 0,86 mm., 0,62 mm. high distally, about one and a half as long as high. The small chela is 3,75 mm. long, palm 1,45 mm. long, fingers 2,3 mm., and the palm is 0,82 mm. broad near the articulation of the fingers; this chela, only a little shorter than the larger, has a more slender shape, being 4,6-times as long as broad, while the fingers are one and a half as long as the palm. The palm, like that of the other leg, has no transverse groove near the dactylus and is smooth, though furnished with long hairs along the upper and lower border at the inner side; though the fingers are straight and parallel, they leave a narrow interspace between them and they are, on the inner side, covered with hairs.

In the younger specimen both peraeopods of the 1st pair are wanting and in both females also the legs of the 2nd pair.

In the larger female the merus of the 3rd leg is $6^1/_4$-times as long as broad in the

middle, the carpus 3,4-times as long as thick at the distal extremity, while the relative measurements are: merus 2,2, carpus 1, propodus 1,45, dactylus 1.

The younger female bears still one leg of the 4th pair. The merus is 5-times as long as broad, the carpus 4-times as long as thick at the distal extremity and the relative measurements are the following: merus 1,82, carpus 1, propodus 1,46, dactylus 0,9.

Ova 0,26—0,28 mm. long, a little less broad.

The type-specimens of *Alpheus lepidus* were obtained in Madura-bay and in Kwandang-bay-entrance.

32. *Alpheus Bastardi* Cout.

Alpheus Bastardi H. Coutière, Alpheidae Mald. and Laccad. Archip. 1905, p. 907, Pl. LXXXV, fig. 45—45*b*.

Stat. 172. August 26—28. Gisser, anchorage between this island and Ceram-Laut. Reef. 1 ova-bearing female.

This female is 17,5 mm. long from apex of rostrum to tip of telson. The acute rostrum that projects by more than half its length beyond the rounded orbitae, is 0,22 mm. long and reaches, the visible part of 1st antennular article being 0,56 mm. long, about to the second third part of the latter. There is no trace of a rostral carina. Telson 1,95 mm. long, width anteriorly 1,12 mm., distance between the postero-lateral angles 0,6 mm., so that it is more than 3-times as long as this distance; anterior pair of dorso-lateral spinules implanted before the middle, the distance from the posterior margin being 1,12 mm., posterior pair just midway between the anterior pair and the posterior margin. As regards the antennal and antennular peduncles and the scaphocerite, this specimen agrees with COUTIÈRE's figure 45, but the terminal spine of the scaphocerite, that projects a little beyond the apex of the lamella, extends as far forward as the antennular peduncle. Spine of basicerite very small.

The large cheliped is wanting, the small one on the right side. Infero-internal margin of the merus with a small acute tooth at the distal extremity and with 3 or 4 movable spinules at unequal distances. Chela 4,9 mm., palm 2,4 mm., fingers 2,5 mm. long, the palm 1,18 mm. high; fingers a trifle longer than the palm, closely shutting together, palm twice as long as high.

The carpal segments of the right leg of the 2nd pair are 1,36 mm., 0,75 mm., 0,34 mm., 0,32 mm. and 0,6 mm. long, the chela 1 mm. (palm 0,46 mm., fingers 0,54 mm.); for the left leg these numbers are in the same succession: 1,35 mm., 0,72 mm., 0,36 mm., 0,34 mm., 0,6 mm., the chela 1,04 mm. (palm 0,48 mm., fingers 0,56 mm.). The 1st segment appears in the right leg 1,8-, in the left 1,87-times as long as the 2nd, according to COUTIÈRE the proportion should be 2.

The merus of the 3rd peraeopods is 4,66-, that of the 4th 4,8-times as long as broad in the middle.

The two nearest allied species are *A. leviusculus* Dana (J. G. DE MAN, l. c., 1911 (text), p. 411, 1915 (plates), Pl. XXIII, fig. 98—98*b*) and *A. microrhynchus* de Man (J. G. DE MAN,

l. c. 1911 (text), p. 413, 1915 (plates), Pl. XXIII, fig. 99 and 99*a*), especially the former. In these species the rostrum is continued as a low rounded ridge, respectively as a narrow, obtuse carina, that only extends as far as the corneae of the eyes. The small chela of the female of *A. leviusculus* is almost 5-times as long as high, in *A. Bastardi* only 4,1-times, in a female of *A. microrhynchus* from Bangkok, long 43 mm., described by me in 1898 (Mémoires Soc. Zoolog. de France, 1898, p. 318), the palm of the small chela was 3-times as long as high. In *A. microrhynchus* the infero-internal margin of both chelipeds is unarmed and the 1st carpal segment of the 2nd pair appears in the full-grown female more than twice, in younger specimens almost 3-times as long as the 2nd. *A. microrhynchus* is moreover a species of large size, attaining a length of 85 mm.

General distribution: Minikoi (COUTIÈRE); Mascate (COUTIÈRE); Madagascar (COUTIÈRE); Djibouti (COUTIÈRE); Panama (COUTIÈRE).

33. *Alpheus euchirus* Dana. Pl. IV, fig. 18—18*b*.

? *Alpheus euchirus* J. D. Dana, U. S. Explor. Exp. Crustacea, p. 545, Pl. XXXIV, figs. 6*a—f*.
Alpheus euchirus J. G. de Man, Siboga Exp., Monogr. XXXIX*a*[1], Part II, Family Alpheidae, 1911 (text), p. 434.

Stat. 273. December 23/26. Anchorage off Pulu Jedan, east coast of Aru-islands. (Pearl-banks). 13 m. Bottom sand and shells. 1 male of medium size.
1 male and 1 egg-bearing female collected by Prof. SLUITER in the Bay of Batavia.
1 full-grown ova-bearing female collected 10 May 1909 by Mr. VAN NOUHUYS west of Segli, north coast of Sumatra, at a depth of 72—126 m.

The male from Stat. 273 and the two specimens from the Bay of Batavia belong to that species which was described by me in detail in 1897 as a variety of *A. hippothoë* de Man (in: Zoolog. Jahrb. (SPENGEL) IX. Abth. f. Syst. p. 754, Pl. 36, figs. 66—66*c* and in: Notes from the Leyden Museum, XX, 1898, p. 210), and to which belonged also the 10 specimens described in 1911 (l. c.). The male from Stat. 273, which bears an epicarid in the left side of the carapace, is 19 mm. long, the large cheliped is placed on the left side, the small one on the right. The large chela is 9 mm. long, palm 5,5 mm. long and 3,75 mm. high, tooth at the distal end of the upper border of the palm, behind the groove, subacute; acute tooth on the infero-internal margin of the merus well-developed, while it is very small and rudimentary on the merus of the smaller cheliped. Small chela 6,5 mm. long, palm 3 mm. long, slightly shorter than the fingers, and 1,9 mm. high. Tooth on the meri of the 3rd and 4th pair of legs well-developed, like in fig. 66*c* (l. c.).

The male and the female from the Bay of Batavia are respectively 25 mm. and 27 mm. long, the 1st peraeopods are wanting in both.

The full-grown female from the north coast of Sumatra, that is nearly 37 mm. long, does not quite agree with the preceding specimens. In this specimen namely (Fig. 18) the orbital hoods project each forward as a vertically-compressed rounded lobe, that extends along the proximal third of the free part of the rostrum and that laterally is distinctly separated from the antero-lateral border of the hood by a slight emargination; in a lateral view of the

carapace (Fig. 18*a*) this lobe looks like a short acute spine, nearly as in DANA's figure 6*a*. According to my description of 1911 these prominences of the orbital hoods did also occur in an adult male from the west coast of Flores and in other specimens, but sometimes were less conspicuous and this is also the case in the preceding specimens from Stat. 273 and from the Bay of Batavia. The acute tooth on the merus of the 3rd (Fig. 18*b*) and 4th legs is in this female much smaller than in the preceding specimens, looking exactly as in DANA's figure 6*f*. This specimen should therefore perhaps be referred with more right to the true *A. euchirus* Dana, but it appears still uncertain, because, like in the preceding specimens, the merus of the 1st pair of peraeopods is armed with an acute tooth at the infero-internal margin, while according to DANA ("brachio apicem non spinigero") the merus should be unarmed. The large chela, on the right side, agrees with the preceding specimens, it is 17 mm. long, the palm 12 mm.; the smaller chela is 12,5 mm. long, fingers as long as the palm, that is 3 mm. high. (In DANA's figure 6*d* the palm appears much higher, but this figure no doubt represents the small chela of the male).

The identification of these specimens with DANA's species appears therefore still doubtful.

Family PROCESSIDAE.

34. *Processa aequimana* (Paulson). Pl. IV, fig. 19—19*f*.

Nika aequimana O. Paulson, Izslyedovaniya Rakoobraznuikh Krasnagho Morya. Chast. I. Kiev, 1875, p. 97, Pl. XIV, figs. 6—6*a*.
Processa aequimana G. Nobili, in: Annal. Scienc. Nat. 9e Sér. Zool. T. IV, 1906, p. 79 (translation of PAULSON's description).

Stat. 181. September 5/11. Ambon-anchorage. 54 m. Bottom mud, sand and coral. 6 specimens.

In my work, issued January 1920, on the Caridae of the Siboga Expedition four probably different species of this genus were described and figured by me (p. 203, Pl. XVII, fig. 52—52*f*) under the name of *Processa* sp.; the adult female from Stat. 193 was the first, which I am now inclined to identify with *Proc. processa* (Bate), the young male from Stat. 4 and the two young males from Stat. 261 were the second, the egg-bearing female from Stat. 4 and the specimen from Stat. 104 the third, the young female from Stat. 154, finally, the fourth species. The 6 specimens from Amboina now apparently belong to the third of these species and are now referred to *Proc. aequimana* (Paulson) from the Red Sea; PAULSON's work is in my possession, though only the plates can be utilized by me, but the late Dr. NOBILI has given (l. c.) a translation of the russian description. This species now differs from the first of the four described by me, besides by other characters, by the stouter shape of the antennular peduncle and of the peraeopods of the 1st pair, by the smaller number of carpal joints of the 2nd legs and by a smaller size; it differs from the second and the fourth by the anterior pair of dorsolateral spinules of the telson being placed more forward, from the second moreover by the less stout shape of the chela of the 2nd legs, from the fourth, finally, by the pleura of the 5th abdominal somite being unarmed.

Three of the 6 specimens are egg-bearing and of the same size as the fourth, that may be a male, the two last specimens are of a smaller size. This fourth specimen shall now be described in detail. It proved to be 14,7 mm. long, the carapace 4,4 mm. long and 2,25 mm. high, the abdomen 10,3 mm. long. The rostrum (Fig. 19, 19*a*) is 1,08 mm. long, one-third of the length of the carapace and extends horizontally forward to the end of the eye-peduncles; viewed from above, the rostrum agrees with the figures 52 and 52*f* (l. c.), being styliform except at the base, in a lateral view it gradually narrows to near the bidentate tip, the height in the middle being $^1/_6$ the length; of the two acute points, in which the rostrum terminates and that are slightly

directed downward, the upper is half as long as the lower. At first sight PAULSON's figure 6 of the rostrum, looked at from above, does not seem to agree with our specimen; but below the base of the rostrum the semicircular prominence, from which in PAULSON's figure the rostrum proceeds forward, becomes also visible by means of the microscope in our specimens. I now suppose that PAULSON has erroneously drawn this prominence as the base of the rostrum and that the true base of the latter was overlooked by him. Carapace of a stout shape, only twice as long as high, rostrum included; antennal spine well-developed and curved inward when looked at from above, antero-lateral angle rounded.

Abdomen a little more than twice as long as the carapace. Fifth somite with no tooth at the obtuse posterior angle of the pleura. Telson (Fig. 19*c*) 2 mm. long, one-fourth the rest of the abdomen, tapering much backward, the width of the posterior margin, 0,24 mm., being hardly half the width (0,55 mm.) anteriorly. Anterior pair of dorso-lateral spinules 0,22 mm. long, 0,36 mm. distant from the posterior margin of the 6th somite, this distance one-fifth (in the figured telson of the female one-sixth) the length of the telson; posterior pair 0,18 mm. long, situated about midway between the anterior pair and the tip. Of the two terminal spinules at either side of the tip the longer one is 0,4 mm., the other 0,13 mm. long. Outer uropod slightly longer than inner, both surpassing a little the telson.

The antennular peduncle differs from that of the adult female from Stat. 193 (l. c. fig. 52) by its less slender form: the 2nd joint, indeed, is only three times as long as wide, viewed from above, and only one and a half as long as the 3rd. The antennular peduncle is as long as the antennal scale, which much resembles that of the female from Stat. 193 (l. c. fig. 52), but the distal border runs almost transversely and is distinctly surpassed by the terminal spine. The antennal peduncle hardly extends beyond the strongly excavated basal joint of the peduncle of the upper antennae, spine at the outer angle of 2nd joint well-developed.

The antepenultimate joint of the outer maxillipeds reaches as far as the antennal peduncle.

Merus of left simple leg (Fig. 19*e*) of 1st pair slender, 1,7 mm. long, 6-times as long as wide in the middle; carpus 0,65 mm. long, 3-times as long as wide distally; propodus 0,84 mm. long, one-fourth longer than the carpus, nearly 4-times as long as wide proximally and distinctly tapering; dactylus 0,3 mm. long, half as long as the carpus.

Merus of the right chelate leg (Fig. 19*d*) 1,6 mm. long, $5^1/_3$-times as long as wide in the middle; carpus 0,58 mm. long, half as wide distally as long; chela 0,92 mm. long, about one and a half as long as the carpus, 3-times as long (in a lateral view) as wide proximally, fingers nearly half as long as the palm. In the female the fingers are somewhat longer.

The right peraeopod of the 2nd pair (Fig. 19*f*) is 5,6 mm. long (merus 1,4 mm., carpus 2,24 mm., chela 0,48 mm.), the left 5 mm. long (merus 1,28 mm., carpus 2,06 mm., chela 0,46 mm.); in both legs the carpus is divided into 13 segments, while in PAULSON's specimen, a female, it was divided into 11; of the carpus of the right leg the 1st or proximal segment is 0,4 mm. long, the 2nd 0,15 mm., the last joint 0,24 mm. long and 0,145 mm. broad in the middle, fingers as long as the palm, chela 0,155 mm. broad, 3-times as long as broad; of the carpus of the left leg the 1st segment is 0,37 mm. long, the 2nd 0,15 mm., the last 0,22 mm. long and 0,14 mm. broad in the middle, chela 0,46 mm. long and 0,15 mm. broad, also 3-times

as long as broad, fingers as long as palm. According to PAULSON the proportion between the length of the two subequal legs of the 2nd pair should be like 226 : 205, in the present specimen it is like 226 : 202. Also in the other specimens there are 13 segments in the carpus.

This specimen bears still the right leg of the 3rd pair, the left is lost like also the two posterior pairs. This leg is 6,38 mm. long and very slender; ischium with 2 spines on the lower margin, one at the base, the other a little beyond the middle; merus 1,76 mm. long, with 5 spines on the lower margin, carpus 1,7 mm. long, almost as long as the preceding joint, propodus 1,1 mm., two-thirds of the carpus, dactylus 0,38 mm. long, one-third of the propodus.

Eggs small, 0,22 mm. long.

In PAULSON's female the carapace was 4,5 mm. long, his specimen had the same size as those described above.

35. *Nikoides Sibogae* de Man.

Nikoides Sibogae J. G. de Man, Siboga Exp., Monogr. XXXIX*a*[3], Part. IV, Caridae, 1920, p. 193, Pl. XVI, fig. 50—50*j*.

Stat. 181. September 5/11. Ambon-anchorage. 54 m. Bottom mud, sand and coral. 1 female of medium size.

This female is 23 mm. long (carapace 7,8 mm., abdomen 15,2 mm.). The rostrum extends a little beyond the eyes, though it is still distinctly shorter than basal antennular article; it is 2 mm. long, slightly more than one-third the rest of the carapace and the greatest height at the proximal third measures just $^1/_8$ the length; of the two teeth in which the rostrum terminates, the lower is one and a half as long as the upper.

Antennular peduncle as in the female from Stat. 260 (l. c.), but the 2nd joint is $1^3/_4$-times as long as 3rd. The external maxillipeds project by the two last joints beyond the antennal scale. The merus of the right chelate leg reaches just beyond the base of the terminal joint of the antennal peduncle and, measured laterally, appears 6,4-times as long as thick in the middle; the carpus, that measures $^2/_5$ of the merus, appears 2,9-times as long as broad distally in a lateral view, being a little more slender than in the full-grown female from Stat. 260. While the merus is 3,7 mm. long, the carpus and chela show respectively a length of 1,5 mm. and 2,1 mm., the chela being one-third longer than the carpus, in the full-grown female, however, almost one and a half as long; fingers nearly half as long as the palm. The simple left leg is wanting.

As regards the other peraeopods I confine myself to indicating the measurements only of those of the 5th pair: merus 4,9 mm. long, carpus 4,5 mm., propodus 4 mm., dactylus 1,4 mm.

Family CRANGONIDAE.

36. *Aegeon orientalis* Henderson.

Aegeon orientalis J. R. Henderson, A contribution to Indian Carcinology, 1893, p. 446, Pl. XL, figs. 16, 17.

Aegeon orientalis Stanley Kemp, in: Records Indian Museum, Vol. XII, Part VIII, Calcutta 1916, p. 378.

Stat. 133. July 25/27. Anchorage off Lirung, Salibabu-island. 36 m. Bottom mud and hard sand. 1 young female.

This specimen is 14,5 mm. long, measured in the middle line from tip of rostrum to tip of telson, the carapace being 4,3 mm. long, the abdomen 10,2 mm.; the latter is almost $2^1/_2$-times as long as the carapace. The rostrum, that measures $^1/_{11}$ the length of the rest of the carapace, hardly reaches to the middle of the eyestalks, not yet to the corneal portion; the distal margin is truncate, but armed at either angle with a small acute tooth, which measures only $^1/_6$ the length of the rostrum; at the inner side of the right tooth a third, supernumerary of course, is observed, as long as the right, and both teeth are a little smaller than the left. The lateral tooth is placed a little behind the middle of the oblique lateral margins, the distance between the apices of the lateral teeth is 3-times as long as the distance between the two at the distal border of the rostrum. The eyestalks measure one-fifth the length of the carapace, rostrum included; the corneal portion is 0,6 mm. broad, three-fourths the length of the eyestalk, distinctly faceted, of a pale colour, while the emargination of the cornea is nearly black.

The five carinae of the 1st abdominal somite and the median carina of the 2nd terminate each in a small spine. Both on the 2nd and on the 3rd somite, at either side of the middle line, the lower half of the tergum, except near the posterior margin, is situated on a lower level than the upper half, the boundary line running with a curve from the anterior margin backward and downward; this boundary line is regarded by Stanley Kemp as a carina, for he says "there are two longitudinal carinae on either side of the second abdominal somite". The other carina is formed by the boundary between tergum and pleuron, but this boundary is rounded and appears therefore hardly as a carina.

The exopodite of the 2nd pleopod is 2,5-times as long as broad, the endopodite has the same length as the outer branch, but, being implanted on a lower level, does only reach to the distal sixth of it and is 4-times as long as broad; the styliform stylamblys presents well-developed cincinnuli at the tip and extends to the distal third of the endopodite.

General distribution: Gulf of Martaban (Henderson); Persian Gulf (Kemp); Port Blair, Andamans (Kemp).

Family SCYLLARIDAE.

37. *Scyllarus* sp.

Stat. 75. June 5th. 4° 57'.4 S., 119° 2'.8 E. Off Makassar. Plankton. 1 very young specimen.

I do not succeed in identifying this specimen with one of the known species, because it shows still juvenile characters: it will perhaps once prove to be the young of *Scyllarus Martensii*, a species known from Makassar, because the 3rd abdominal tergum is much more prominent than the rest. This specimen is 7,1 mm. long from the anterior border of the carapace to the end of the telson. The carapace is 2,6 mm. long, measured in the median line, the antero-lateral angles that project a little beyond the anterior border of the carapace, are 3,2 mm. distant, the carapace appearing here $^1/_5$ broader than long. A little in front of the anterior third, at 1 mm. from the antero-lateral angle, the lateral margins of the carapace show a small incision and a somewhat smaller incision exists in the middle; the lateral margins are armed along their whole length with numerous small teeth of somewhat unequal size and length; between the antero-lateral angle and the anterior incision one observes at the right side 7, at the left 8 teeth, between the two incisions 8 and behind the posterior one about 15 teeth at either side. The anterior border of the carapace appears behind the antennular segment broadly rounded, but reaches here less forward than the lateral parts of the anterior border; in a lateral aspect, however, the anterior border rises here upward as a small acute tooth. A much larger, also acute tooth arises on the posterior half of the gastric region with the bifid acute tip directed forward; a third acute tooth, a little smaller than the gastric one, arises immediately behind the cervical groove. The 2nd and the 3rd tooth are a little uneven above in the midline; at each side of the 3rd one observes on the slightly elevated cardiac region a few minute tubercles, a few occur also more backward, at either side, on the intestinal region, but for the rest the upper surface appears between the lateral carinae smooth. The lateral carinae are as usual divided by the cervical groove into a shorter anterior and a longer posterior portion; both portions are denticulate, the anterior presenting two larger teeth anteriorly behind one another, the posterior terminating anteriorly in an acute tooth, behind which 3 or 4 smaller teeth occur. Outer border of the orbits denticulate. Posterior margin of carapace concave in the middle.

The antennular segment bears at either side a tooth or spine on the anterior border, the apices of which are 0,52 mm. distant, nearly $^1/_6$ the distance between the antero-lateral angles of the carapace; a much smaller denticle occurs on the anterior border at either side and close to the median incision.

The basal joint of the inner antennae presents distally a prominence of which the outer angles are obtuse, while it ends in the middle in a rather obtuse tooth.

Looked at from above the basal joint of the outer antennae proves to be armed with four strong acute spines, the most prominent in the middle of the anterior border, one more internally, the 3rd at the outer angle, while the 4th occurs at a lower level also at the outer angle; in front of the 4th spine the joint presents a rounded lobe, projecting forward. The 4th joint or proximal outer squame is about as long as broad, but the larger triangular part is $^1/_5$ longer than broad. The outer margin presents a small incision a little in front of the middle and is armed along its whole length with 22 or 23 small, acute, subequal teeth, ten before the incision, the rest behind it; one observes on the inner margin of the triangular part an acute tooth a little behind the middle and between this tooth and the tip eight somewhat smaller teeth; the inner border of the inner part of the joint ends distally in a tooth, which is somewhat larger than the teeth of the outer part. The inner margin of the 5th joint ends in an acute, the outer in a subacute tooth and close to each the anterior border bears a somewhat larger tooth. The distal squame has four lobes on the anterior and two on the inner border; the free margin of these lobes is armed with small acute teeth or spines and the lobes gradually decrease in width from the outer one to those of the inner border, of which the anterior is larger than the posterior one, the smallest of all, but the anterior is much smaller than the contiguous fourth lobe of the anterior border. On the upper surface of all the joints short setae are implanted.

First abdominal tergum rounded, 2nd, 3rd, 4th and 5th sharply carinated in the middle line, the carinae are prominent, especially that of the 3rd, which is the highest and most prominent of all; on each side of the carina the terga show the trace of an oblique groove that runs towards the postero-lateral angle. The terga are for the rest nearly smooth, presenting only a few microscopic granules, tipped with short setae, especially near their posterior margin. The posterior margin of the 6th tergum has a small subacute tooth in the middle, a somewhat larger acute tooth at the outer angles and a smaller one between the median tooth and the latter. Pleura smooth, denticulate along the margins. Anterior segment of thoracic sternum with a shallow notch in the middle.

Thoracic legs fringed along the margins of their joints with short, more or less spiniform setae. Those of the 2nd and 3rd pair are rather not much compressed.

Body pubescent, the short setae, however, rather sparse.

Family NEPHROPSIDAE.

38. *Enoplometopus longirostris* de Man. Pl. IV, fig. 20—20*b*.

Enoplometopus longirostris J. G. de Man, in: Archiv f. Naturg. 53. Jahrg. 1888, p. 488, Pl. XXI, fig. 4.

Stat. 37. March 30/31. Sailus Ketjil, Paternoster-islands. Surface, in the plankton. 1 specimen.
Stat. 248. December 4/5. Anchorage off Rumah Lusi, North-point of Tiur-island. "pelagisch". 1 specimen.

Besides these two still a third specimen is lying before me, one of the six from Amboina described (l. c.) in 1888 and which is preserved in my private collection. The three specimens are nearly of the same size, about 23 mm. long. In the specimen from Stat. 37 the lateral margins of the rostrum are armed at each side with 3 spines. The lateral row consists, according to the original description, of 3 posterior spines placed on the gastric region and 2 anterior ones on the rostrum; in the specimen from Stat. 37 one observes on the left side 3, on the right 2 spines on the rostrum, the 3rd supernumerary spine on the left side being smaller than the preceding, placed in front of them, just behind the posterior one of the 3 marginal spines. The five median spines on the carapace are low, not prominent and of equal size, the posterior one placed on the cervical groove. Lower margin of the rostrum with 7 teeth, decreasing in size from the posterior one to the anterior one. Outer orbital angle acute, though not spiniform. Just above this angle a rather deep groove proceeds almost from the orbital margin backward for a short distance, curves at first downward and runs then forward to nearly midway between the curve and the antennal spine; cervical groove inconspicuous, but on the branchial region two long parallel and oblique grooves exist, of which the anterior almost unites with the first described groove there where it curves downward.

Pleura of the 2nd abdominal somite with two small teeth on the anterior border, which posteriorly terminates in a strong tooth; according to the original description there were three small teeth on the anterior margin. The small tooth on the lateral margins of the telson, just in front of the posterior spine, is still inconspicuous. In the specimen from Stat. 248 the lateral margins of the rostrum bear only two spines at either side, but for the rest one observes the typical number; the left pleuron of the 2nd abdominal somite bears only one small tooth on the middle of the anterior border, while this border has no teeth at all on the right pleuron, in both, however, the posterior spine is well-developed. In this species the telson is broadly grooved above to near the base and a little behind the level of the anterior pair of marginal spines, at either side of the middle line and close to it, 2 or 3 long setae are implanted that reach to the posterior extremity of the telson.

In the young female from *Enoplom. occidentalis* (Randall) from Amboina the anterior margin of the 1st antennal segment is armed at the inner side of the tubercle, bearing the opening of the antennal gland, with a spine that is directed forward and slightly inward: in *Enoplom. longirostris* this spine is wanting.

The examination of the abdomen revealed the remarkable fact 1° that the 1st somite is destitute of appendages, 2° that the pleopods of the 2nd, 3rd, 4th and 5th somites bear all a well-developed appendix interna or stylamblys of which the tip is provided with a cluster of cincinnuli. As far as I know in all the Nephropsidae the 1st abdominal somite should bear a pair of uniramous appendages, while the pleopods of the four following somites should be destitute of an appendix interna, (A. Alcock, A descr. Catal. Indian Deep-Sea Crustacea, Calcutta 1901, p. 150, also L. A. Borradaile, in: Annals and Mag. Nat. Hist., Ser. 7, Vol. XIX, 1907, p. 473). I did not succeed in detecting genital apertures in one of the three specimens lying before me. The sternum of the 1st abdominal somite is quite smooth. In the specimen from Stat. 37 the two branches of the 2nd pleopod (Fig. 20) are subequal in length and width, the endopodite bears just behind the proximal third of the inner border a stylamblys which is 0,54 mm. long, being a little shorter than half the length (1,32 mm.) of the branch; the stylamblys is slender, 13- or 14-times as long as wide and there is a cluster of cincinnuli (Fig. 20*a*) at the tip. In the 3rd pleopod the stylamblys (Fig. 20*b*) is implanted at the posterior fourth, it shows the same length as that of the 2nd, but it is considerably thicker, only 9-times as long as thick; the 4th pleopod fully agrees with the 3rd, while the 5th, that was not dissected, no doubt also agrees with it.

According to Professor Alcock's cited work, p. 9, in the Macrura Astacides the antennal scale, if foliaceous, should not conceal the terminal joint of the antennal peduncle entirely. In the young female of *Enoplom. occidentalis* the antennal peduncle is not entirely concealed by the antennal scale, projecting a little beyond it, but in *Enoplom. longirostris* the antennal scale extends far beyond the antennal peduncle, which it conceals entirely.

It appears to me quite probable that *Enoplom. longirostris* will once prove to be the young of a still unknown species, because it differs too much from *Enoplom. occidentalis* or *pictus* to be considered as a young of these two.

EXPLANATION OF THE PLATES.

PLATE I.

Fig. 1. *Gennadas clavicarpus* de Man. Lower part of the anterior border of the carapace of the adult male from Stat. 185, presenting the branchiostegal spine of moderate size, × 17.

Fig. 2. *Solenocera pectinata* (Bate). Rostrum of the female, long 45 mm., from Nias, × 17.

Fig. 3—3*d*. *Penaeopsis intermedia* (Kishinouye) var. *anchista* de Man. — 3 the male, long 77 mm., from the Kei-islands, × $^4/_3$; 3*a* petasma of this male, × 6; 3*b* posterior half of abdomen of this male, × 2; 3*c* lateral view of the extremity of telson of this male, × 6; 3*d* thelycum of the larger female, long 80 mm., from Ternate, × 6.

Fig. 4—4*b*. *Penaeopsis* sp. A very young specimen, long 19 mm., from Stat. 166. — 4 rostrum, × 22; 4*a* posterior part of abdomen, × 17; 4*b* posterior half of telson, × 33.

Fig. 5. *Parapenaeus* sp. Rostrum and anterior margin of the carapace of the very young specimen from Stat. 47, × 33.

Fig. 6, 6*a*. *Sicyonia laevis* Bate. Female from Stat. 7. — 6 distal half of rostrum, × 40; 6*a* thelycum, × 40.

Fig. 7. *Sicyonella inermis* (Paulson). Anterior part of carapace of the female with eye-peduncles etc., × 50

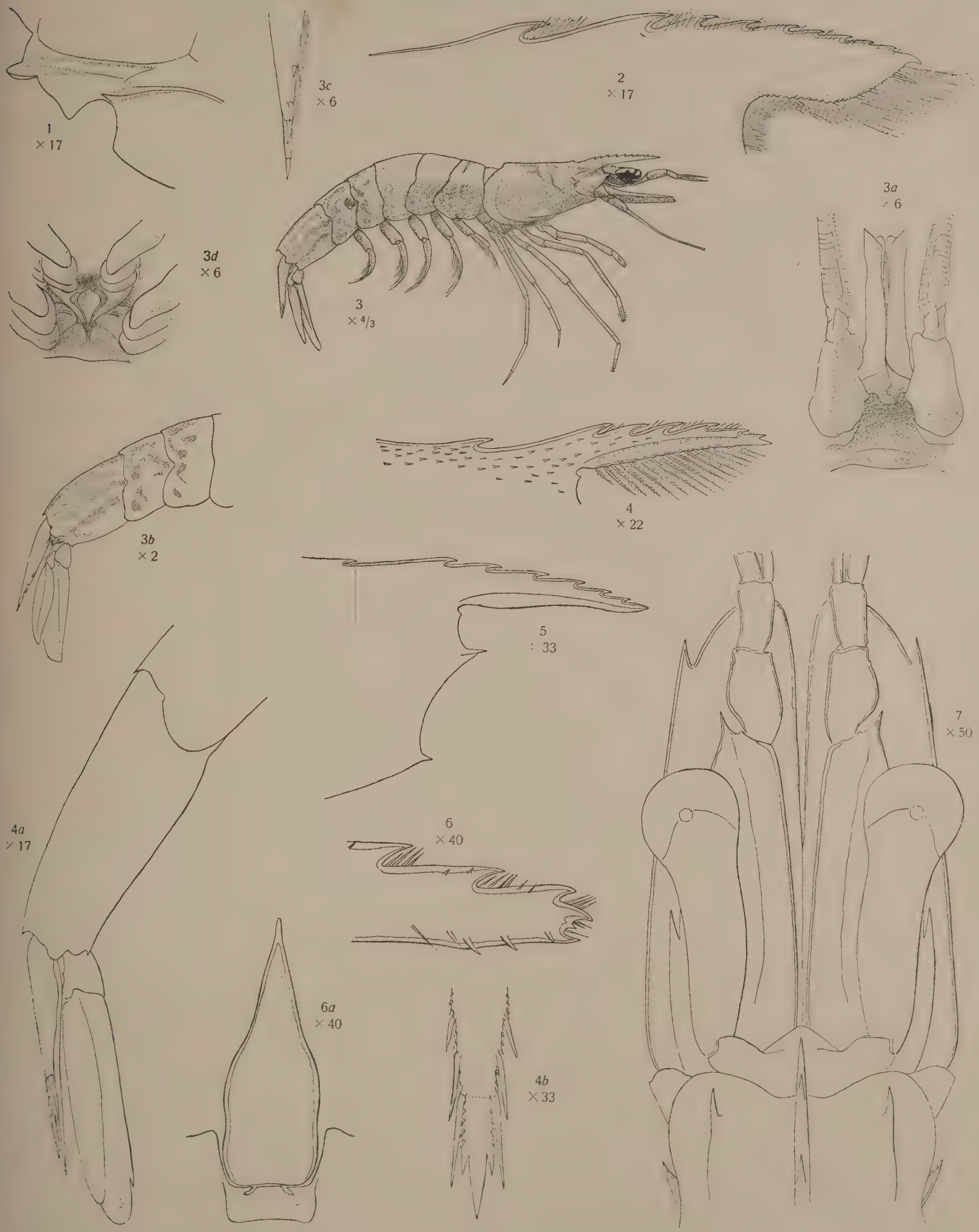


Fig. 3—3*d* J. F. OBBES, the other figures J. G. DE MAN, del.

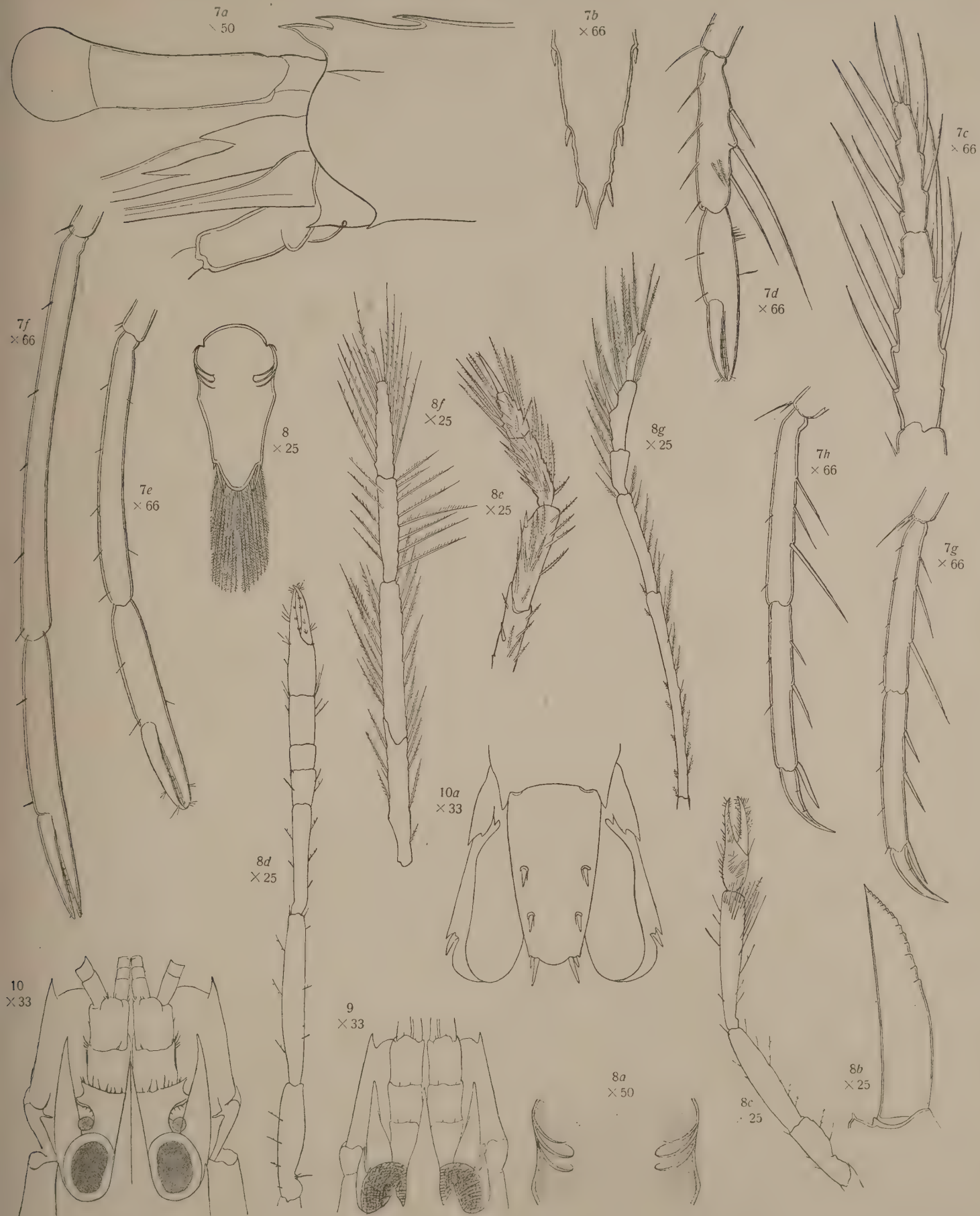
PLATE II.

Fig. 7*a*—7*h*. *Sicyonella inermis* (Paulson). All the figures are taken from the female. — 7*a* lateral view of the anterior part of carapace with eye-peduncles etc., × 50; 7*b* posterior half of telson, × 66; 7*c* the two last joints of the external maxilliped, × 66; 7*d* carpus and chela of the peraeopod of 1st pair, × 66; 7*e* the same of 2nd pair, × 66; 7*f* the same of 3rd pair, × 66; 7*g*, 7*h* the three last joints of the peraeopods of 4th, respectively 5th pair, × 66.

Fig. 8—8*g*. *Ogyrides Sibogae* (de Man). Egg-bearing female, long 13 or 14 mm., from Ambon. — 8 lower surface of telson, × 25; 8*a* anterior part of lower surface, × 50; 8*b* scaphocerite, × 25; 8*c* peraeopod of 1st pair, 8*d* of 2nd pair, 8*e* of 3rd pair, 8*f* of 4th and 8*g* of 5th pair, all the peraeopods, × 25.

Fig. 9. *Athanas Naifaroensis* Cout. Frontal and antennal region of the specimen from Stat. 213, × 33.

Fig. 10—10*a*. *Athanas Stebbingii* de Man. The typical female from Stat. 323. — 10. Frontal and antennal region, × 33; 10*a* caudal fan, × 33.


7a
× 50
7b
× 66
7c
× 66
7d
× 66
7e
× 66
7f
× 66
7g
× 66
7h
× 66
8
× 25
8a
× 50
8b
× 25
8c
× 25
8d
× 25
8e
× 25
8f
× 25
8g
× 25
9
× 33
10
× 33
10a
× 33

J. G. DE MAN, del.

PLATE III.

Fig. 10*b*—10*f*. *Athanas Stebbingii* de Man. The typical female from Stat. 323. — 10*b* right leg of the 1st pair, × 20; 10*c* lateral view of the chela of this leg, × 20; 10*d* left leg of the 2nd pair, × 20; 10*e* right leg of the 3rd pair, × 20; 10*f* left leg of the 5th pair, × 20.

Fig. 11—11*f*. *Arete Iphianassa* de Man. — 11 rostrum of the ova-bearing female from Stat. 213, × 33; 11*a* second pleopod of the male from Stat. 213, × 66; 11*b* distal half of the two appendices, × 135; 11*c* fused part of the left outer antennular flagellum of the male, × 66; 11*d* of the female, × 66; 11*e* larger cheliped of the male, × 17; 11*f* cutting-edges of the fingers of this cheliped, excepting the tips, × 50.

Fig. 12—12*c*. *Alpheopsis* sp. Specimen from Stat. 166. — 12 Frontal and antennal region, × 50 (the setae are drawn simple, not feathered); 12*a* peraeopod of the 1st pair, × 33; 12*b* proximal half of the cutting-edges of the fingers of this leg, × 100; 12*c* leg of the 3rd pair, × 50.

Fig. 13, 13*a*. *Synalpheus amboinae* (Zehntner). Large chela of the larger specimen from Krakatau, looked at from the outer and from the inner side, × 4.

Fig. 14, 14*a*. *Synalpheus hastilicrassus* Cout. var. *acanthitelsoniformis* de Man. Male from Stat. 115. — 14 extremity of telson, × 50; 14*a* upper side of the basicerite, × 50.

Fig. 15—15*c*. *Synalpheus* sp. Egg-bearing female from Stat. 144. — 15 Frontal and antennal region, × 27; 15*a* telson, × 27; 15*b* leg of 3rd pair, × 27; 15*c* dactylus of this leg, × 106.

Fig. 16—16*c*. *Alpheus anchistus* de Man. — 16 Telson of the egg-bearing female from Ambon, × 17; 16*a* small cheliped of this female, × 11; 16*b* two of the spinelets on the lower margin of the merus of this cheliped, × 50; 16*c* leg of 3rd pair of the male from Ambon, × 11.

Fig. 13, 13*a* J. F. GIBBES, the other figures J. G. DE MAN, del.

PLATE IV.

Fig. 17. *Alpheus lepidus* de Man. Small cheliped of the larger female, looked at from the inner side, × 17 (the leg is lying somewhat obliquely, so that the merus and the chela appear a trifle less broad).

Fig. 18—18*b*. *Alpheus euchirus* Dana. Ova-bearing female from the north coast of Sumatra. — 18 Frontal and antennal region, × 8; 18*a* the same looked at laterally, × 8; 18*b* peraeopod of the 3rd pair, × 6.

Fig. 19—19*f*. *Processa aequimana* (Paulson). All the figures are taken from the specimen, long 14,7 mm., which is supposed to be a male, excepting 19*c* which is the telson of an egg-bearing female. — 19 rostrum, eye-peduncles etc., viewed from above, × 33; 19*a* rostrum etc., viewed from above, × 50, *a* peduncle of the right eye; 19*b* lateral view of rostrum, × 50; 19*c* telson of the female, × 50 (here the distance between the anterior pair of spinules and the base measures only one-sixth the length of the telson); 19*d* right, 19*e* left leg of 1st pair, × 50; 19*f* carpus and chela of the right leg of 2nd pair, × 50.

Fig. 20—20*b*. *Enoplometopus longirostris* de Man. — 20 2nd pleopod, × 50; 20*a* extremity of stylamblys of this pleopod, × 320; 20*b* stylamblys of 3rd pleopod, × 50.

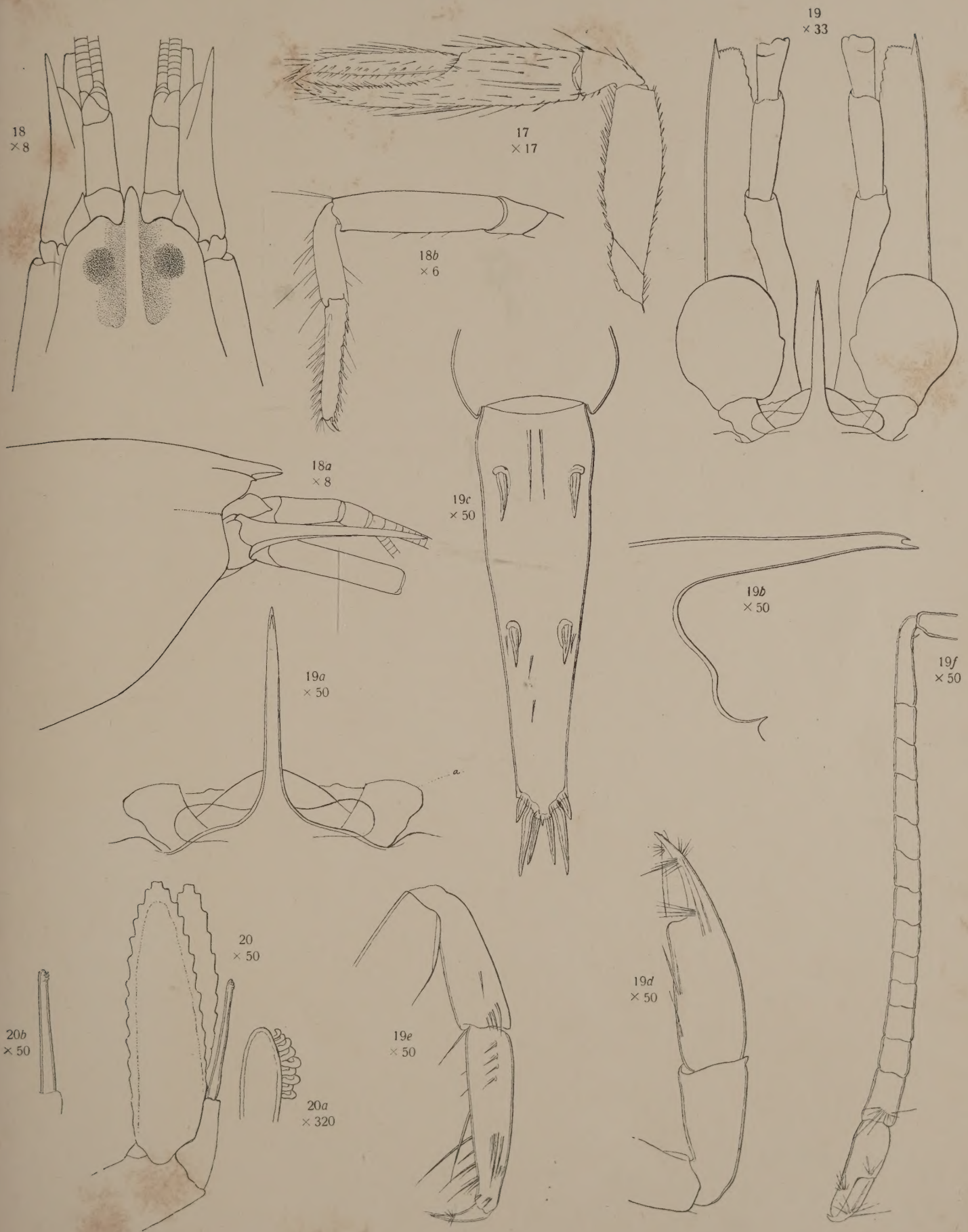


Fig. 18—18*b* J. F. OBBES, the other figures J. G. DE MAN, del.